DEVOTED TO RESEARCH AND CLINICAL STUDY OF THE DISEASES AND PROCESSES OF THE AGED AND AGING

Geriatrics

Official Journal of the AMERICAN GERIATRICS SOCIETY

VOLUME 2 January - February 1947 NUMBER 1

iron + vitamin B complex

for the older patient

'Lirimin' Capsules, an exceptionally valuable geriatric preparation, provide readily assimilated iron and the vitamin B complex for oral treatment of secondary anemias and certain nutritional deficiencies so often encountered in the aged. • Frequent causes of hypochromic anemia in elderly patients are dietary inadequacy or diminished absorption from the alimentary tract. Iron-deficiency anemia may also result from chronic hemorrhage which is characteristic of such common conditions as hemorrhoids or gastrointestinal ulceration. • In each of these conditions the administration of 'Lirimin' Capsules is specifically indicated. • Each 'Lirimin' Capsule contains: Ferrous sulfate, exsiccated, 0.3 Gm.; Thiamine hydrochloride (Vitamin B_1) 0.25 mg.; Riboflavin (Vitamin B_2) 0.5 mg.; Liver-Yeast Concentrate, 0.15 Gm., together with other natural factors of the Vitamin B-Complex derived from the liver-yeast component. • Supplied in vials of 100 capsules. Sharp & Dohme, Philadelphia 1, Pa.

SHARP & DOHME

'LIRIMIN' capsules

Ferrous Sulfate with Liver-Yeast Concentrate and the Vitamin B Complex

GERIATRICS

Official Journal of the American Geriatrics Society

EDITORIAL BOARD
A. E. HEDBACK, M.D., *Editor*

Associate Editors

EDWARD B. ALLEN, M.D., White Plains, New York
FREMONT A. CHANDLER, M.D., Chicago, Illinois
WILLIAM J. DIECKMAN, M.D., Chicago, Illinois
HAVEN EMERSON, M.D., New York City
JONATHAN FORMAN, M.D., Columbus, Ohio
GEORGE R. HERRMANN, M.D., Galveston, Texas
TREVOR H. HOWELL, M.R.C.P. Ed., Purley, Surrey, England
WINGATE M. JOHNSON, M.D., Winston-Salem, North Carolina
NORMAN JOLLIFFE, M.D., New York City
FOSTER KENNEDY, M.D., New York City
WILLIAM J. KERR, M.D., San Francisco, California
F. L. PHILIP KOCH, M.D., Bronxville, New York
GEORGE W. KOSMAK, M.D., New York City
CHAUNCEY D. LEAKE, Ph.D., Galveston, Texas
OSWALD SWINNEY LOWSLEY, M.D., New York City
J. A. MYERS, M.D., Minneapolis, Minnesota
GEORGE E. PFAHLER, M.D., Philadelphia, Pennsylvania
E. A. ROVENSTINE, M.D., New York City
EDWARD A. STRECKER, M.D., Philadelphia, Pennsylvania
MALFORD W. THEWLIS, M.D., Wakefield, Rhode Island
WILLARD OWEN THOMPSON, M.D., Chicago, Illinois
E. L. TUOHY, M.D., Duluth, Minnesota
WALTER E. VEST, M.D., Huntington, West Virginia
MAURICE B. VISSCHER, M.D., Minneapolis, Minnesota
S. MARX WHITE, M.D., Minneapolis, Minnesota

LG16.051
G31

700020

IN THE FREQUENTLY OVERLOOKED

Human Phase OF NUTRITION

HUMAN nutrition presents many phases not encountered in experimental studies. The laboratory animal, driven by hunger, will eat and thrive on any food substance that is adequately nutrient. Taste and variety and meal satisfaction are of little moment in such nutritional studies.

In human nutrition, the joy of eating, and especially the satisfaction of having eaten well, play an important role. Frequently, though physiologic hunger has not come about, it is the pleasant memory of the last meal that engenders the appetite.

To add satiety value to the meal, candy may well serve as its last course. Even an otherwise drab meal gains much when topped off by a piece or two of candy.

Confections in the manufacture of which milk, butter, eggs, fruits, and nuts or peanuts are used, are particularly suited for this purpose. This is true because of their universal taste appeal, but also because they contribute small amounts of many essential nutrients.

THE NUTRITIONAL PLATFORM OF CANDY

1. Candies in general supply high caloric value in small bulk.

2. Sugar supplied by candy requires little digestive effort to yield available energy.

3. Those candies, in the manufacture of which milk, butter, eggs, fruits, nuts, or peanuts are used, to this extent also—

(a) provide biologically adequate proteins and fats rich in the unsaturated fatty acids;

(b) present appreciable amounts of the important minerals calcium, phosphorus, and iron;

(c) contribute the niacin, and the small amounts of thiamine and riboflavin, contained in these ingredients.

4. Candies are of high satiety value; eaten after meals, they contribute to the sense of satisfaction and well-being a meal should bring; eaten in moderation between meals, they stave off hunger.

5. Candy is more than a mere source of nutriment—it is a morale builder, a contribution to the joy of living.

6. Candy is unique among all foods in that it shows relatively less tendency to undergo spoilage, chemical or bacterial.

This Platform is Acceptable for Advertising in the Publications of the American Medical Association

COUNCIL ON CANDY OF THE *National Confectioners' Association*

1 NORTH LA SALLE STREET CHICAGO 2, ILLINOIS

GERIATRICS

Official Journal of the American Geriatrics Society

VOL. II, NO. 1

CONTENTS

JANUARY-FEBRUARY 1947

Many Factors May Influence Senescence . . . . . NATHAN S. DAVIS, M.D., F.A.C.P. 5

Some Clinical Aspects of Intraoral Age Changes . . . . HAMILTON B. G. ROBINSON, D.D.S., M.S. 9

Surgery of the Prostate Gland . . . . . OSWALD S. LOWSLEY, M.D., F.A.C.S., AND ALBERTO GENTILE, M.D. 13

Uterine Bleeding: Menopausal and Postmenopausal . . . . . BERNARD L. CINBERG, M.D. 17

Vitamin D Therapy in the Treatment of Scleroderma and Allied Conditions: Three Cases . C. FREDERICK NORMAN, M.D., F.A.C.S. 24

The Wechsler-Bellevue Scale in Individuals Past Sixty . M. J. MADONICK, M.D., AND MARIAN SOLOMON, M.S. 34

The Basic Factors of Nutrition in Old Age . . . . . JOSEPH T. FREEMAN, M.D. 41

Editorials:

The New Year 50

The Menopause 51

Digests from Current Literature 54

GERIATRICS is published bimonthly at Minneapolis. Publication dates: January, March, May, July, September, November. Subscription rates: $5.00 a year, $1.00 a copy; foreign, $6.00 a year, $1.20 cents a copy. Address all editorial and business correspondence to GERIATRICS, 84 South Tenth Street, Minneapolis 2, Minnesota.

ADVERTISING REPRESENTATIVES. NEW YORK 17: George Doyle, Lee Klemmer, Arthur Young, 1 East 42d Street, Suite 801, Corn Exchange Building. Telephone: Murray Hill 2-8717. CHICAGO 11: Jay H. Herz, Suite 1921, 20 North Wacker Drive. CHICAGO 6, ILL. Telephone: Central 4619. CLEVELAND 14: Bernard A. Smiler, 1125 Fidelity Building. Telephone: Main 3619. SAN FRANCISCO 4: Duncan A. Scott & Co., Mills Building. Telephone: Sutter 1393. LOS ANGELES 15: Duncan A. Scott & Co., 408 Pershing Square Building, 448 South Hill Street. Telephone: Michigan 6203.

Copyright 1946 by MODERN MEDICINE PUBLICATIONS.
Title Reg. U.S. Pat. Off. Entered as second-class matter February 14, 1946, at the post office at Minneapolis, Minnesota under the act of March 3, 1879

Hemoglobin Regeneration Plus . . .

"One of the most direct therapeutic technics is the administration of salts of iron in certain types of anemia; when the condition is due largely to low iron intake or to defective utilization of iron, and when a trace of copper is present, regeneration of hemoglobin follows such treatment."

—Editorial: Ferrous vs. Ferric Iron, J.A.M.A., 127:1056 (April 21) 1945.

. . . More Rapid Nutritional Pick-Up

However, rapid return of the *feeling of well-being* would not so generally follow administration of Licuron-B if it did not provide, in addition to the proper ratio of copper and iron, correction of the B-vitamin deficiency which so frequently complicates hypochromic anemia.

The ratio of copper to iron in Licuron-B assures efficient utilization of the iron. The incidence of gastrointestinal reactions, often seen in iron therapy, is reduced because it is possible to give less iron and still get a more rapid regeneration of hemoglobin. During administration of Licuron-B the level of general health often rises as dramatically as does the level of hemoglobin. The grateful patient is enjoying improved nutrition occasioned by the liver B-vitamins and crystalline thiamine, riboflavin and niacinamide in Licuron-B.

Small, easy-to-take Licuron-B tablets are supplied in bottles of 100, 500 and 1000. Literature and sample on request. Wisconsin Alumni Research Foundation—U. S. Pat. No. 1,877,237.
LAKESIDE LABORATORIES, INC., *Milwaukee 1, Wisconsin.*

Licuron-B

LIVER COPPER IRON B-COMPLEX

MANY FACTORS MAY INFLUENCE SENESCENCE

Nathan Smith Davis, M.D., F.A.C.P.

As more and more people live to reach three score years and ten, it becomes necessary for clinicians and scientific investigators to pay more attention to the degenerative and involutionary changes of senescence. A good deal is now known about the developmental processes of infancy and childhood, but very little about the maintenance of maturity and the retardation of the involutionary and degenerative processes of advancing years. Nor do we know which of the changes commonly met with in older men and women are due to normal involution and which are due to disease.

Much work is being done in an effort to solve the cancer problem, and many generous donations by individuals and foundations and appropriations by legislative bodies are available to finance cancer research. Until recently, however, almost no contributions have been made to promote the study of arterial diseases, though they cause many more deaths than cancer does.

Arterial disease is rarely given as a cause of death. Instead, deaths of which it is the real cause are ascribed to disease of the organ whose circulation is most impaired. If a similar procedure was followed in deaths due to malignant disease, few deaths would be attributed to carcinoma and many more to disease of the stomach, breast, prostate, and intestine.

Possibly the very prevalence of arterial pathology in advancing years accounts for the fact that most laymen, and many physicians as well, consider it a normal accompaniment of the involutionary process. Yet some types of arteriosclerosis, notably atherosclerosis and arteriolosclerosis, the two varieties that cause the greatest number of deaths, are certainly due to disease processes.

However, despite the general lack of gerontological and geriatric research, many factors are known to influence the rate of development of involutionary and degenerative changes and the age at which they appear. One of these factors is heredity. Thus, diabetes mellitus, cancer, gout, hypertension, and atherosclerosis are known to be more prevalent in some families than in others. It is also known that these diseases develop during the fifth or sixth decades in some families and not until later in others.

Nathan Smith Davis III, M.D., F.A.C.P., of Chicago, is Assistant Professor of Medicine, Northwestern University Medical School, and a member of the attending staff of Wesley Memorial Hospital. Dr. Davis, whose specialty is internal medicine, is past secretary and past president of the Chicago Medical Society, past vice president of the American Therapeutic Society, and present director of the Mississippi Valley Medical Society, whose Distinguished Service Award he received in 1943.

There is evidence also that the health of the parents at the time of conception and the health of the mother during pregnancy and lactation influence the health, and probably also the longevity, of the offspring.

It is still difficult or impossible to state definitely whether heredity or prenatal disturbances cause the early development and prevalence of some of the involutionary and degenerative changes in certain families. Postnatal environmental factors, such as familial habits of living, working, and especially of eating, may have the same effect. Future medical and biological research should make it possible to determine which of these conditions are due to heredity, which to prenatal influences, and which to postnatal influences in early life and in early or late maturity.

Nutritional status in any period of life influences senescence. During the past few years much has been learned about the nutrients essential for normal growth, but little is known about what amounts of each are essential either for normal maturity or to retard the onset of senescence. There is evidence that certain quantities and proportions of minerals, vitamins, and amino acids are necessary for the normal functioning of certain organs and that other combinations are necessary for the normal functioning of others. Some organs require fats and others carbohydrates, and all require certain of the protein split-products.

There are many examples of how one dietary component may reduce the intake of another essential to normal life. Some of these components act as precursors for a physiologically required substance, permitting the synthesis of this substance in the body to any extent necessary. Others reduce the amount of a nutrient required by assuming its functions, acting as a precursor to diminish those not conducive to the best utilization of the required nutrient, or functioning as a complete substitute. There are also many components that interfere with the absorption of essential nutrients from the gastrointestinal tract, with the formation of vitamins by intestinal bacteria, and with the formation or action of respiratory enzymes and hormones.

A diet is adequate only when it contains the amounts of minerals, vitamins, and amino acids required to metabolize the carbohydrates, proteins, and fats consumed. It must also contain the carbohydrates, proteins, and fats required to satisfy individual caloric requirements. Overeating, even of an optimal diet, causes obesity—which is not conducive to longevity.

The individual who is to enjoy a ripe old age must have a normal digestive tract; must be relatively free from acute and chronic infections or other types of disease; and must not be exposed to toxic chemicals and compounds of endogenous or exogenous origin. Under these conditions food will be properly digested, adequately absorbed from the intestinal tract, and made available in optimal amounts to all the tissue cells.

There is evidence that vitamins and other dietary essentials have specific effects on different tissues. It appears also that the changes produced as a result of nutritional failure depend on both the intensity of the deficiency

and the speed with which it develops. Furthermore, recently reported studies on aircraft workers in southern California make it clear that an intake of vitamins adequate for the prevention of recognized deficiency states may nevertheless be inadequate for optimal efficiency. Such suboptimal diets, when long continued, may cause both reversible and irreversible alterations in cellular chemistry. These investigators found also that to overcome the effects of chronic suboptimal nutrition it is necessary to supply large amounts of vitamins over a long period. Chronic mild nutritional failure responds to treatment more slowly than acute and severe failure do. Further, treatment of such failure demands a higher intake of essential nutrients than is required for the prevention of the syndromes described as characteristic of nutritional deficiencies.

The factors that cause the early development of involutionary and degenerative changes in advancing years, and speed their progress, are chronic nutritional failure and even chronic suboptimal nutrition, plus the cumulative effects of repeated acute and more or less severe episodes of nutritional failure. Such alterations in histochemistry may be caused by:

1. Nutrition, improper in quantity, quality, timing, and, especially, in content of essential nutrients.
2. Improper medication, that is, the unnecessary or badly controlled use of drugs, either through self-medication or through failure to follow the physician's instructions.
3. Disease that is in essence chemical poisoning.
4. Exposure to or ingestion of toxic chemicals.
5. Excessive mental or physical exertion, excitement, and nervous strain, and exposure to extreme climatic conditions, all of which put extra demands on tissue metabolism.
6. Deprivation of oxygen, which is all-essential to nutrition.
7. Any combination of the above factors.

The suboptimal nutrition or nutritional failure that results from these conditions causes in turn: first, tissue depletion; second, biochemical changes; third, functional change; and fourth, anatomical changes. The effects are rarely recognized until the functional changes have become far advanced and many anatomical changes have occurred. Tissue depletion and biochemical changes are undoubtedly reversible. Functional changes may or may not be reversible. Anatomical changes are irreversible. Treatment begun, as it usually is, after the symptoms become troublesome, is therefore usually relatively ineffective. However, even at this stage it may still be possible to arrest further progress if the patient can and will take an optimal diet, can properly utilize the food ingested, and is willing to lead a life that will minimize fatigue and exposure to weather, disease, and toxic chemicals.

In summary: To prolong maturity and postpone the onset and retard the development of the involutionary and degenerative changes of old age, one must have long-lived ancestors and healthy parents and must learn to

prefer optimal diets, to be satisfied with diets of low rather than high caloric value, and to avoid all factors that may induce suboptimal nutrition or nutritional failure.

Remarks on the Treatment of Essential Hypertension.

S. MARX WHITE. *J. Oklahoma M.A.*, 39:101-4 (March), 1946.

Many cases of arterial hypertension have no demonstrable cause and might be designated as neurogenic hypertension. It is supposed that there is an increased number of nervous impulses carried by vasomotor nerves, with a resultant increased peripheral resistance through widespread arteriolar contraction. Psychiatric participation in treatment of such cases may be indicated by manifestations of neurosis, a not uncommon accompaniment of hypertension; such treatment may represent a more effective approach than unilateral nephrectomy, ablation of the sympathetic nervous system, or drugs. Arterial hypertension provides an instance of the ultimate effect of emotional states upon the entire body, acting through the cardiovascular system.

The diencephalic syndrome is mentioned, chiefly to warn against subtotal thyroidectomy simply because of marginal elevation of the basal rate, with slight diffuse enlargement of the thyroid gland, tachycardia, hyperperistalsis, and irregular flushing over the upper parasympathetic area. These phenomena also accompany labile hypertension, and characterization of them as the diencephalic syndrome is due to their similarity to the signs brought on by diffuse stimulation of the diencephalon.

Endocrinology in the Aged.

HARRY BENJAMIN, M.D. *The Interne*, 12:465-69 (July), 1946.

The reason why we grow old is a mystery still scarcely penetrated by the biologist and biochemist. The statement that "man is as old as his endocrines" is an oversimplification. The endocrine glands, which age with the rest of the organism, by their ability or lack of ability to withstand the aging process determine the manner (the "when and how") in which old age manifests itself in the individual. Nor do these glands explain longevity, which is chiefly an inherited characteristic, though subject to environmental influences and the mode of living.

Old age presupposes glandular deficiencies. The parathyroids show the least change with age and their function seems to be preserved even in advanced age. The gonads are the most important glands in contributing to the cause or symptoms of aging. The ovaries show the greatest senescent changes of all endocrine glands, but woman is able to maintain health and vitality without ovarian function.

"Gerontotherapy" endeavors to retard senescence and postpone senility, chiefly through endocrine therapy. The chief methods are described. The ACS developed by Bogolomets is mentioned as a typical gerontotherapeutic procedure that has captured the public imagination and should be carefully evaluated by medical men.

SOME CLINICAL ASPECTS OF INTRAORAL AGE CHANGES

Hamilton B. G. Robinson, D.D.S., M.S.

THE mouth is subject to changes with age as are other parts of the body. The detailed aspects of these changes have been reviewed by Robinson, Boling, and Lischer (6), and by Thomas (8). Many of the effects of age within the oral cavity have the same terminal points as have developmental, hereditary, metabolic, infectious, and traumatic diseases. Thus, the most striking oral change of senility, absence of teeth, may result from anodontia (developmental or hereditary), diabetic periodontosis (metabolic), caries or periodontitis (infectious), or accidental injury (trauma), as well as from aging.

Statistical study (1) shows that the number of missing teeth per person increases with each decade of life, until, at age 70, 80 per cent of women and 70 per cent of men have lost all their teeth. At younger ages the teeth are lost chiefly because of dental decay, but in older persons periodontal disease becomes the most important cause of extraction. In addition, abrasion, attrition, erosion, and physical and chemical injuries are factors. As the promise of dental caries prevention by carbohydrate control, fluoride application, antidegradants, and other methods continues to develop into actuality, the importance of periodontal structures in the older person will become increasingly significant.

Since many of the changes wrought by age may likewise be caused by disease processes, a discussion of the relative roles of some of these diseases of the teeth is appropriate.

DENTAL CARIES

Dental caries is the progressive destruction of the hard structures of the teeth by a process initiated on the tooth surface by bacterially-produced acids. As the deeper dentin is reached, proteolytic as well as acidogenic bacteria may play a role, and there appears to be a variant of the usual carious process which starts by invasion of the organic dental lamellae in the enamel.

While caries is commonly considered a disease of the young, Klein and

---

HAMILTON B. G. ROBINSON, D.D.S., M.S. (Pathology), is Professor of Dentistry at Ohio State University. Dr. Robinson was formerly Associate Professor of Oral Pathology and Histology at Washington University, St. Louis, in which city he held several hospital appointments. He is a member of the International Association for Dental Research and of Sigma Xi and a Fellow of the American Academy of Oral Pathology and of the American Association for the Advancement of Science. He was Rockefeller Fellow in Dentistry at the University of Rochester from 1934 to 1937 and received research grants from the Markle Foundation from 1939 to 1942. Dr. Robinson is President of the Columbus (Ohio) Board of Health and Editor of the *Journal of Dental Research*.

h 616.051
631
700030

Palmer (5) described a catalytic curve derived from the relationship between carious attack on the lower first permanent molar and tooth age which indicates that the yearly rate of attack is the same at all posteruptive ages for this tooth; that is, 19.03 per cent of the susceptible lower first molars are attacked annually. Sloman (7), on the other hand, concluded that there is a substantial decrease in caries rate during middle life. It appears, however, that the percentage of susceptible teeth that become carious at any age remains constant. Since the number of susceptible teeth at any age equals the number susceptible the previous year minus the number attacked within the previous year, there may be a reduction in the number of new cavities per year without a reduction in the attack rate. In short, age appears to have only a passive role in the carious process.

Attrition and Abrasion

Attrition is the wear on the contacting surfaces (occlusal and interproximal) resulting from mastication. Other factors being equal, the amount of wear is directly proportional to age. Of course, the abrasiveness of the food, the hardness of the teeth, and occupational hazards may be important factors. Aborigines, who chewed crudely milled flour containing abrasive particles, wore their occlusal surfaces to a degree far in excess of the wear on the morsal surfaces of modern man's teeth, subjected to the highly refined flour of today. Persons with dentinogenesis imperfecta (hereditary opalescent dentin), a disease resulting in soft dentin and excessive chipping away of enamel, may show wear from attrition at 14 years of age, an age comparable to that at which old aborigines show such wear. Pelt-chewing Eskimos may have teeth worn to the gingival level at an early age, and the anterior teeth of glass blowers may show excessive wear. On the other hand, some individuals at age 70 present occlusal surfaces that show little evidence of use.

However, time remains the most important factor in attrition for any homogeneous group, and the horse trader is not the only person who may consider attrition of the teeth a rough index of age.

Abrasion is the mechanical wearing away of the tooth surface by processes other than mastication. It is most commonly produced by the use of dentifrices containing abrasives. Since no modern dentifrices sold in the United States appear to have enough abrasiveness to wear enamel, the importance of dentifrice abrasion increases with age, as the root surfaces become exposed. Some popular dentifrices could wear halfway through a tooth root in less than eight years of average brushing (4). Kitchin (3) found that unprotected root surfaces increased from 58 per cent at ages 20 to 29 to 95 per cent at ages 50 to 59. Abrasion may also result from occupational trauma, in sand blasters, for example. Because of increased exposure of the root surface with age and the time element in dentifrice abrasion, tooth abrasion is much more common in old persons.

Erosion

Erosion may be defined as a condition of the teeth characterized by loss of substance beginning on the outer surface of the enamel and leaving a smooth polished surface. Its etiology is unknown, but it is assumed to be the result of a physicochemical process (6). The incidence and prevalence of erosion increase with age.

Periodontal Diseases

The relationship between aging and periodontal diseases is more complex. The periodontium of the tooth includes the periodontal membrane—the connective tissue that attaches the tooth to its bony socket; the alveolar process, that part of the maxilla and mandible which forms the sockets of the teeth; the cementum, which covers the root surface of the tooth; and the gingiva, the mucous membrane surrounding the tooth and the epithelial attachment, which forms the union between the gingiva and the tooth. These structures are subject to such diseases as gingivitis (inflammation of the gingiva), periodontitis (inflammation of the periodontal membrane), periodontosis (degeneration of the periodontium), traumatism (traumatic disturbance of the supporting structures of the teeth), hyperplasia, and hypertrophy. Aging has its greatest importance in periodontosis and traumatism.

Gottlieb (2) demonstrated, and many others have confirmed, the apical proliferation of the epithelial attachment with age. This process represents the continued passive eruption of the tooth. In the young person the epithelial attachment is approximately at the point of union of the enamel and cementum; in the older person the attachment may be entirely on the root surface. There is also a continued active eruption of the teeth, compensated by a deposit of secondary cementum. Eruption, both active and passive, is accompanied by reduction in the height of the alveolar process (physiologic alveolar atrophy).

It is sometimes difficult to differentiate between age changes and periodontosis. Exposure of the root surfaces does not appear to be a necessary accompaniment of aging. In our clinic we have observed patients beyond the age of 70 who had gingival and other periodontal structures suggestive of those of young individuals, and one of these patients was a man with marked dental attrition. Pathologic trauma, metabolic disturbances, calcareous deposits, and infections may accelerate or complicate the aging process. Periodontosis is usually characterized by pocket formation between the cementum and gingiva, while in the healthy gingiva receding with age the ideal depth of the gingival sulcus approaches zero. Traumatism, such as that produced by improper brushing of the teeth, may be differentiated from passive eruption by the individual case history.

Traumatism, which may result from a pathologic relationship between attrition and alveolar atrophy, has been discussed in its relationship to the

aging process by Robinson, Boling, and Lischer (6) and by Thomas (8). The reader is referred to these publications.

TABLE I
RELATIONSHIP BETWEEN CERTAIN ORAL CONDITIONS AND AGE

LESION	CAUSE	ROLE OF AGING
Dental caries ..	Products of bacterial metabolism (acids) and proteolytic activity.	Unimportant.
Attrition	Wear on contacting surfaces during mastication.	Time element important, with abrasiveness of foods, density of teeth, and occupational hazards contributing.
Abrasion	Wear on tooth surfaces from factors other than mastication.	Increased exposure of susceptible root surfaces and time element important.
Erosion	Unknown (? physicochemical).	More common in older than in younger age groups.
Periodontosis .	Degenerative changes in supporting structures of teeth.	Unimportant, except for greater prevalence in older age groups.
Alveolar atrophy (physiologic)	Aging and stress.	Primary cause. A normal condition in senile individuals.
Periodontal traumatism ...	Physical trauma.	Unequal activity of two physiologic aging processes, attrition and alveolar atrophy, may accelerate the process.

SUMMARY

The relationships between age and dental caries, attrition, abrasion, erosion, and periodontal disease are discussed. These data are tabulated in Table 1. Aging appears to be more important, etiologically, in attrition, abrasion, and traumatism than in caries, erosion, and periodontosis. Disease processes may accelerate age changes in the mouth, and, conversely, age changes may afford greater opportunity for invasion by microorganisms. The gerontologist should consider the mouth in evaluating the effects of age. It may afford important clues when the chronologic and physiologic ages of an individual differ.

REFERENCES

1. BREKHUS, P. J.: Your Teeth. Minneapolis: University of Minnesota Press, 1941.
2. GOTTLIEB, B.: Der Epithelansatz am Zahne. Deutsche Monat. f. Zahnheilk, 38:142, 1921.
3. KITCHIN, P. C.: The Prevalence of Tooth Root Exposure. J. Dent. Research, 20:565, 1941.
4. KITCHIN, P. C., and ROBINSON, H. B. G.: Unpublished data.
5. KLEIN, H., and PALMER, C. C.: The Relationship between Post-eruptive Tooth Age and Carious Attack Rate of the Lower First Permanent Molar. J. Dent. Research, 18:283, 1939.
6. ROBINSON, H. B. G.; BOLING, L. R.; and LISCHER, B. E.: *In* COWDRY, E. V.: Problems of Ageing. Baltimore: Williams & Wilkins Company, 1942. Chap. 13.
7. SLOMAN, E.: Sex and Age Factors in the Incidence of Dental Caries. J. Am. Dent. A., 28:441, 1941.
8. THOMAS, B. O. A.: Gerondontology. J. Am. Dent. A., 33:207, 1946.

SURGERY OF THE PROSTATE GLAND

Oswald S. Lowsley, M.D., F.A.C.S.,
and Alberto Gentile, M.D.

OPERATIONS upon the prostate gland have been a major concern of the urological surgeon for over a century and a quarter, during which time great strides have been made in this field.

HISTORICAL RESUMÉ

Credit for the first operation upon the obstructed bladder neck, as well as for the first recognition of the condition known as "median-bar obstruction," as opposed to obstruction resulting from enlargement of the prostate gland itself, apparently belongs to George James Guthrie, an English army surgeon. This operation, an account of which he published in 1834, was a transurethral procedure in which he made use of a catheter carrying a concealed blade, with which he divided the "bar at the neck of the bladder."

Modern prostatic surgery dates back to the introduction of Listerian principles of asepsis. Perineal prostatectomy probably preceded the suprapubic operation by several years. Early advocates of the perineal route were Billroth and Leisrink, who employed it in cancer of the prostate in 1867 and 1883, respectively; Socin, 1874; Reginald Harrison of England, 1881; Goodfellow, 1891; and the Viennese surgeon Zuckerkandl, who, in 1889, performed the first total perineal enucleation of the prostate through a perineal transverse crescentic incision. Another interesting pioneer of perineal prostatectomy is Dr. Regino Gonzalez of Mexico, who in 1901 reported several operations by this route. Great impetus was given to perineal prostatic surgery by the work of Proust and Albarran in France and in America by Hugh Hampton Young and the surgeons trained under his leadership.

FROM the Department of Urology, James Buchanan Brady Foundation of the New York Hospital. The funds necessary for the completion of this study were provided by the Davis and Geck Research Fund. This paper is adapted from a lantern slide lecture presented before the American Geriatrics Society at the Third Annual Meeting, New York City, June 14, 1946.

DR. OSWALD SWINNEY LOWSLEY, director of the Department of Urology, James Buchanan Brady Foundation, New York Hospital, is consultant in urology to many hospitals. He is a member of the American Urological Association, of which he is a past president, the International College of Surgeons, and the International Society of Urologists, and an associate editor of GERIATRICS.

ALBERTO GENTILE, M.D., is Assistant Resident, Department of Urology, James Buchanan Brady Foundation of the New York Hospital. A graduate of the Faculty of Medicine of Bahia, Brazil, Dr. Gentile is Assistant Professor of the Faculty of Medical Sciences, Rio de Janeiro. He is a corresponding member of the American Urological Association and a member of the Brazilian Urological Society, of whose *Annals* he was editor in 1940, and of the Society of Medicine and Surgery of Rio de Janeiro.

The complete perineal operation as now performed is the conception of Zuckerkandl, modified by Young and others.

Suprapubic prostatectomy is said to have been successfully done by McGill of Leeds, England, in 1887, and at about the same time by Belfield of Chicago, and to these two is generally credited the suprapubic operation. Eugene Fuller and Ramon Guiteras, both of New York, and Sir Peter Johnson Freyer of London contributed much to the perfecting of the method.

The idea of using the cautery to remove bladder-neck obstructions dates from 1877, when Bottini, an Italian surgeon, designed an instrument which achieved considerable popularity. In 1900 Albert Freudenberg of Berlin devised his so-called "cystoscopic prostatic incisor," which has been called the ancestor of the modern resectoscope. This instrument was patterned after Bottini's cautery, but embodied original cystoscopic features. In 1911 Hugh H. Young presented his punch for the removal of barlike obstructions. This punch was modified and its scope greatly increased by Caulk, who in 1920 added a cautery attachment.

In 1910 Beer's successful use of the high-frequency current in the treatment of bladder tumors ushered in a new era in the handling of bladder-neck obstructions. In 1926 Maximilian Stern presented his instrument—the first modern resectoscope. Notable among the many contributors to the field of transurethral resection since then have been McCarthy, Bumpus, Collings, Foley, Day, Kirwin, and Nesbit.

Types of Lesions

There are five main types of prostatic lesions that cause obstruction of the bladder neck and require surgical intervention, namely:

1. Subcervical group enlargement.

2. Benign adenomatous hypertrophy of the prostate: (a) intravesical, with residual urine and without residual urine; and (b) extravesical, with residual urine and without residual urine.

3. Median bar.

4. Cancer: (a) carcinoma—adenocarcinoma, scirrhous carcinoma, and medullary carcinoma; (b) sarcoma; rhabdomyosarcoma.

5. Calculus.

Benign hypertrophy of the prostate almost always occurs in the middle and lateral lobes; the anterior lobe is rarely affected and the posterior lobe virtually never.

The senior author's own studies showed that the part of the gland which enlarges most frequently is really a contiguous structure—the subcervical group of tubules. These tubules were found to be enlarged in about 25 per cent of men over 30 years of age. Subcervical group enlargement may occur without hypertrophy of the prostate; but when the prostate proper is enlarged, the subcervical group will also be hypertrophied.

Median-bar obstruction presents the same clinical picture as prostatic hypertrophy, except that the patients are usually younger. The operation of choice is transurethral resection.

Carcinoma of the prostate is of frequent occurrence in men over 50 years of age, and is often associated with benign hypertrophy. In over 75 per cent of cases the cancer begins in the posterior lobe—the portion of the gland that is not affected in benign hypertrophy—and consequently does not produce symptoms of urinary obstruction until it has extended into the lateral and median lobes. In the remaining 25 per cent of cases the origin of the cancer may be in the lateral, anterior, or median lobe, and obstruction of the bladder neck is then likely to occur earlier.

Sarcoma and rhabdomyosarcoma are very rare and may occur at any age, including infancy. These tumors grow rapidly and to large size, producing obstruction to both urination and defecation.

Endogenous, or true prostatic, calculi are usually multiple, small, rounded, and scattered throughout the parenchyma of the gland. Occasionally there is a single large calculus or a large stone and a cluster of "seed" calculi. Benign adenomatous hypertrophy and prostatic calculosis frequently coexist, and the calculi will then usually be found, not within the adenoma, but between it and the capsule, embedded in the remnants of the true prostate.

Choice of Operation

It is no more sensible to utilize the same operation for every type of prostatic lesion than to try to fit every foot with the same style and size of shoe. Each prostatic obstruction must be treated by the most appropriate type of operation.

By the use of the cystoscope and the cysto-urethrogram it may be determined whether the obstruction is large or small, intravesical or extravesical. By rectal palpation or biopsy it may be determined whether the enlargement is benign or malignant. These are the factors that should decide which operation shall be performed. The condition of the patient, as shown by the general physical examination, blood chemistry studies, the electrocardiogram, and the phenolsulfonphthalein test of kidney function will indicate whether the operation shall be one stage or two stage in type.

It is noteworthy that many more patients now reach us in good general condition than ever before, owing to the wide publicity given to "prostatic trouble" in the lay press.

It is our practice to do a transurethral resection if the enlargement is confined largely to the lower hemisphere of the vesical orifice. Transurethral resection is indicated also in certain types of malignancy of the prostate. In such cases the operation is done for palliative purposes only and is followed by radium implantation, the administration of stilbestrol, or castration, as the case may require. The transurethral operation is preferable also for certain cases of fibrous bar at the vesical orifice.

Suprapubic prostatectomy is indicated when the enlargement is chiefly intravesical.

Perineal prostatectomy is a proper procedure in cases that present an enlargement mostly extravesical, in early carcinoma, in prostatic calculosis, and in certain types of fibrous prostates that harbor infection and cause rheumatic manifestations.

During the ten-year period from April 1, 1936, to April 1, 1946, 1696 operations (transurethral resection, perineal prostatectomy, and suprapubic prostatectomy) were performed at the Brady Foundation of the New York Hospital for the lesions referred to, namely, benign hypertrophy of the prostate (including subcervical group enlargement), median bar, cancer, and prostatic calculus. These operations were successful, and the results at the time of the patients' discharge from the hospital were very satisfactory. In addition, 115 miscellaneous operations (cystostomy, orchiectomy, etc.) were done for these lesions. Of these 115 patients, 60 were improved, 31 were unchanged, and 24 died.

Summary and Conclusions

Our experience of the last ten years with surgery upon the prostate gland, during which period 1696 operations were performed, has led us to certain conclusions.

It is our opinion that the operation performed upon the patient should be dictated by the type of lesion present. It is highly improper to subject every enlarged prostate to the same type of operation.

In this period we have performed 1049 transurethral resections (62 per cent), 405 perineal prostatectomies (24 per cent), and 242 suprapubic prostatectomies (14 per cent). In this entire series the mortality rate has been 3.5 per cent, the highest mortality being in patients who suffered with carcinoma, as would be expected.

The large number of transurethral resections is accounted for by the fact that we now operate upon many patients who formerly would not have been operated upon at all. This highly desirable state is made possible by improvements in instruments, by the fact that both medical men and laymen have become "prostate conscious," and that laymen no longer fear operation. On the whole, the wide publicity given the various methods of prostatectomy, in both medical journals and the lay press, has been highly desirable and has resulted in great benefit to this class of sufferers.

Three men become aged before their time: he who lives on an upper floor; he who endeavors to raise poultry for a livelihood; and he who gives orders but is not obeyed.—Talmudic Anthology.

UTERINE BLEEDING: MENOPAUSAL AND POSTMENOPAUSAL

Bernard L. Cinberg, M.D.

THE approach of the climacteric usually introduces changes in the menstrual habit long before the final cessation of the menses. It is unfortunate that these disturbing factors must be dealt with at a time when vasomotor imbalances are most likely to be troublesome and vexing.

The reactions of patients to these unusual bleedings are often diametrically opposite. Some women become unduly alarmed over menstrual variations that the physician has learned to consider normal, while others ignore uterine bleedings that are definitely pathologic, on the assumption that they are merely part of the "change of life."

Women at and after the climacteric generally have more leisure than their younger sisters. It should be the task of the geriatrist to teach women in the fifth and sixth decades of life to employ a portion of their leisure time in cultivating good health. In this process of health education lies a golden opportunity for the physician to overcome the aversion to vaginal examinations which most women have in the climacteric age.

It is a common experience for gynecologists to see women who at their first visit present advanced and incurable lesions of the genital tract. The false modesty that advancing years confer on many women offers a challenge to the physician which he cannot ignore.

In such a discussion our first problem is to determine what constitutes normal uterine bleeding at the menopause. Not all healthy women cease menstruating in an identical manner. Abrupt cessation of the menses is a rarity. Usually there is a progressive diminution of the flow or a lengthening of the intermenstrual interval over a period of months and even years, or both. It is also common for women to cease menstruating and then to be subject, after a long interval, to several bleedings before the advent of complete menopause.

Although there is no one normal way for women to enter the menopause, it can be categorically stated that intermenstrual bleeding and men-

---

READ before the Third Annual Meeting, American Geriatrics Society, New York, June 15, 1946.

BERNARD L. CINBERG, M.D., New York, is Chief Gynecologist of the Good Samaritan Dispensary; Assistant Gynecologist, City Hospital; Obstetrician of the Out-Patient Department, New York Polyclinic Hospital; and Instructor in Obstetrics, New York Polyclinic Post-Graduate School. He is a Diplomate of the American Board of Obstetrics and Gynecology, Fellow of the New York Academy of Medicine, and a member of the American Medical Association.

orrhagia at the menopause are not normal physiologic phenomena. In addition, all vaginal bleedings, however slight, that occur after an apparent menopause should be carefully investigated.

Abnormal uterine bleedings may be classified as functional or organic and, depending on the time of their appearance, as menopausal or postmenopausal. Functional uterine bleeding is of great importance at the menopause. With one possible exception, it is never encountered after the climacteric has been established. Uterine bleedings that occur after the menopause are nearly always due to organic causes. At the menopause organic findings are not so constant, or at least they are less common than functional phenomena.

A discussion of functional uterine hemorrhage and the assignment of exact treatment for the various types of bleeding in this classification demand a complete knowledge of the causation of normal menstruation. This knowledge, unfortunately, we do not as yet possess. We do, however, have sufficient information to advance a working hypothesis.

It is not my intention to enter into a detailed discussion of menstruation. It may well be pointed out, however, that three interrelated groups of factors seem to be concerned in ovulatory menstruation. They are the gonadotropic hormones of the anterior pituitary lobe, the ovary and its steroids, and the uterus. The complex mechanism of menstruation consists of a perfect correlation of the proper concentrations of all these hormones and a normal receptivity of the uterus and the affected glands.

Menstruation itself is also a series of events. It is probably initiated by a sudden drop in the level of the hormones elaborated by the corpus luteum. The blood vessels of the endometrium are directly affected by the loss of hormonal support and indirectly by the degeneration of the surrounding endometrial structures. The arteries of the endometrium rupture and the arterioles disintegrate. The resulting bleeding is checked by the neuromuscular elements of the vessels and by the contractions of the myometrium (1). In anovulatory menstruation the initiating factor is probably estrogen deprivation, which brings about a sequence of events similar to those of ovulatory bleeding.

In reviewing these complex interrelationships one can readily understand the prevalence of functional uterine bleeding at the menopause, a period characterized by changing hormonal balances. At this epoch the major endocrine changes are centered in the gonads, but they affect all the components of the menstrual system (2).

Vaginal bleedings may be classified into four types: functional, organic, menopausal, and postmenopausal.

Functional bleeding at the menopause can be diagnosed with certainty only after a complete pelvic examination and a diagnostic curettage.

The patient who complains of abnormal bleeding in the climacteric

must be given the benefit of a careful gynecologic examination. It is inexcusable carelessness for the physician to explain irregular bleeding as due to "change of life" and to begin parenteral or oral estrogenic therapy before a vaginal examination has been made.

It is my opinion that all apparent cases of climacteric functional uterine hemorrhage should be subjected to thorough curettage if the bleeding occurs between periods. The curettage should be done under general anesthesia, sufficiently deep to permit a satisfactory preoperative vaginal examination. This procedure, besides providing a diagnosis, will often cure the bleeding permanently. If the patient continues to bleed postoperatively, roentgen castration may be utilized. Endocrine therapy is not effective for those cases of menometorrhagia that have not responded to curettage.

Climacteric uterine bleedings that are merely accentuations of normally timed menstruation may be dealt with more conservatively. The patient should be seen at monthly intervals and may be treated medically if there are no signs of severe anemia.

Women who suffer from menorrhagia alone and do not bleed irregularly respond well to treatment with androgens. The parenteral use of 25 mg. of testosterone propionate weekly will usually control the flow and alleviate the vasomotor symptoms of the menopause. The use of estrogens is contraindicated, for they may intensify the bleeding (3). If hormonal therapy does not control the flow the patient should be curetted. All bleeding can be terminated by the use of 1500 mg. hours of intrauterine radium or by the roentgen ray, since preservation of ovarian function is no longer necessary. Roentgen castration should never be attempted without a preliminary curettage, since the patient may be suffering from an early uterine or ovarian malignancy.

Mention should be made of a new type of functional bleeding we now see at the menopause. It results from treating the vasomotor symptoms of the climacteric with high dosages of estrogenic preparations (4). These bleedings should not cause undue alarm. If the onset of menometorrhagia is preceded by the administration of estrogens, an immediate curettage is unnecessary. The flow invariably ceases after the estrogens are withheld. The use of estrogens may then be resumed in smaller doses, or they may be used in combination with androgens.

There is no need to fear the carcinogenic properties of these steroids. It has not been established that estrogens in any dosage can cause cancer in women (5). The clinician should feel free to employ these hormones whenever they are indicated.

In discussing organic uterine bleeding at the menopause, it is my intention to consider only the more commonly encountered etiologic factors.

Bleeding from vulvar, vaginal, and rectal structures may confuse the issue. A routine vaginal examination will reveal such conditions.

Bleeding from the cervical portion of the womb may be caused by

erosions, ectropions, and tumors. Erosions, which are due to infections of the cervical canal, and ectropions, which result from the same type of infections or from cervical lacerations, are effectively treated by office procedures. Cauterization, coagulation, and conization are often employed. If these lesions arouse suspicions of malignancy it is imperative that they be biopsied before treatment is instituted.

Tumors of the cervix may be either benign or carcinomatous. Benign cervical polyps are usually responsible for contact staining. The proper treatment for polyps is surgical removal in the operating room under general anesthesia. Operation in the office without anesthesia by means of cutting current is entirely unsatisfactory, since ablation of the local polyp should always be followed by curettage to remove any endometrial growths that may be present. Polyps should never merely be twisted off and discarded. All such tissue must be examined by the pathologist.

Carcinoma of the cervix is more frequently found at the menopause than in the later postclimacteric period. The diagnosis is best made by biopsy, but vaginal smears may also be utilized. In fact, the routine employment of vaginal spreads for detection of uterine carcinomatosis has opened a promising field for mass diagnosis (6).

In recent years carcinoma of the cervix has been treated by radium and X-ray. Now, however, we are witnessing a revival of radical total abdominal hysterectomy in this country, since the availability of the sulfonamides and the antibiotics has rendered this procedure infinitely less hazardous. It is the considered opinion of many tumor experts that cancerous metastases are not susceptible to the roentgen ray. Consequently, only complete surgical removal of the regional lymphatics offers hope for permanent cures (7).

Bleeding caused by organic conditions of the fundus is usually due to benign polyps, myomata, or carcinoma, although one must not overlook the possibility of a gestation in the climacteric.

Endometrial polyps can usually be removed by curettage. This procedure will also reveal carcinoma of the fundus. Malignancy of the fundus, more common postmenopausally, is usually adenocarcinoma.

Fundal carcinoma is usually treated by intrauterine radium, followed in six weeks by total abdominal hysterectomy. Opinions differ as to the best method of procedure. Various modifications of the surgery-radium combination are employed.

Myomata at the menopause respond well to roentgen therapy if they are smaller than the size of a four months' gestation. Some gynecologists prefer supravaginal hysterectomy as a method of treatment in all cases of uterine fibromyomata.

Several types of ovarian tumor, malignant or benign, may cause uterine bleeding. In the fifth and sixth decades granulosa cell tumors are sometimes responsible for uterine bleeding. The bleeding they cause usually

occurs postmenopausally rather than at the menopause. The treatment for ovarian tumor is surgery if the condition of the patient permits laparotomy.

Functional uterine bleeding is seldom encountered after the menopause. However, one type of bleeding these older women exhibit may be so labeled. It is an extremely difficult condition to analyze, but all of us who deal with these older women see it from time to time. I am referring to the elderly woman many years past her menopause who is embarrassed by a sudden profuse uterine hemorrhage that lasts several hours. One usually sees these women within twenty-four hours after the onset of this alarming bleeding, but the gynecologic findings are negative except for traces of old blood in the vagina. It has been my experience that the utmost conservatism should be practised in such cases, for the pelvic organs of these older women are atrophied and all the genital tissues are extremely friable, and a rough examination can of itself produce further bleeding. One should withhold curettage if a careful vaginal examination does not reveal organic pathology. If there is no return of the hemorrhage, and usually there is none, curettage may be withheld indefinitely. Occasionally such an episode is repeated two or three times, at intervals of as long as three years. No harmful effects are experienced.

Such a bleeding is probably the result of the disintegration of a uterine or cervical polyp, and should probably be classified as organic. Upon subsequent examination no trace of such a tumor can be discovered, but I have never employed curettage as a purely diagnostic measure in these cases.

Organic causes for postmenopausal uterine bleedings are more frequently encountered than functional disturbances.

Local vaginal conditions are often responsible for bleeding. Senile vaginitis and erosions of the vaginal wall due to supportive pessaries are frequently seen. These bleedings are seldom alarming, for they are in reality only spottings. They are usually elicited by contact and vaginal examination readily enables the examiner to detect them.

Senile vaginitis is best treated with estrogenic vaginal suppositories. Erosions caused by pessaries may require the temporary or permanent discarding of these appliances. I have often been amazed to find, upon examination, that the vaginal bleeding and pain complained of by an elderly woman are due to a forgotten pessary that has been in her vagina for many months or years. On several occasions I have had to remove these pessaries by cutting them into segments with a dentist's drill. A Gigli saw may also be used.

Only rarely are primary vaginal tumors to be seen for the first time after the climacteric. The uterus itself may be the site of benign or malignant growths. After the menopause the incidence of fundal malignancy is greater than that of the cervical type. All that has been said concerning uterine tumors at the menopause applies also to the postclimacteric age.

The treatment of cervical cancer by total abdominal hysterectomy

depends upon the physical condition of the patient rather than upon her age. The subject is still under consideration, and the final word will not be said until the observations of many years of careful statistical research have been correlated.

Prolapse of the uterus may cause uterine bleeding. This type of bleeding is most frequently encountered after the menopause. The diagnosis is easily made. Some type of operative repair is usually indicated after conservative treatment has healed the abraded surfaces.

Occasionally the debilitated general physical condition of the patient precludes operation, though in my opinion this is only rarely the case. In such circumstances a Gellhorn pessary, or perhaps a spherical plastic contraption, can be utilized.

In my experience the most effective operation has been vaginal hysterectomy, followed by anterior and posterior colporrhaphy, which can be effectively carried out under local anesthesia. Operations whose objectives are partial or total vaginal occlusion are anatomically incorrect.

We have already touched upon ovarian tumors. Carcinoma of the ovary is encountered postmenopausally, but it is seldom accompanied by uterine bleeding. Granulosa cell tumors of the ovary are more likely to cause bleeding. These growths may be malignant. They often produce estrogenic hormones and thus cause the resumption of periodic, menstruation-like bleeding and hypertrophy of the womb. Diagnosis of such tumors is to be considered when curettage reveals hypertrophied proliferative endometrium, together with the presence of a palpable ovarian tumor. The proper treatment for ovarian tumors is surgery. The extent of the operation is dependent upon the findings at laparotomy.

In closing, I wish to emphasize the necessity for a complete gynecologic examination in all cases of uterine bleeding. The prevalence of this complaint at and after the menopause often confronts the geriatrist with a problem that requires him to consult with a trained gynecologist. At the same time, it is imperative for the gynecologist to become thoroughly familiar with the problems peculiar to the older woman. There is a definite need in our aging society for the establishment of geriatric gynecologic clinics, even as our more advanced institutions have already established pediatric gynecologic clinics.

Summary and Conclusions

1. Women at the climacteric often ignore pathologic uterine bleedings on the assumption that they are part of the "change of life."

2. Menstruation is the result of a complex system of hormonal relationships. At the menopause glandular imbalances and resulting abnormal bleedings are common.

3. Vaginal bleedings at this epoch may be classified as functional or organic and as menopausal or postmenopausal.

4. Functional bleeding is commonly encountered at the menopause and seldom in later life. Organic bleeding is more frequent in the postclimacteric period.

5. A careful vaginal examination must be made in all cases of abnormal uterine bleeding.

6. Vaginal smears are useful in the mass diagnosis of uterine carcinomatosis, but curettage and cervical biopsy, under general anesthesia, are still the final diagnostic procedures.

7. The indiscriminate use of the estrogens has produced a new type of functional uterine hemorrhage.

8. There is a genuine need for the establishment of geriatric gynecologic clinics.

References

1. Novak, E.: Gynecology and Female Endocrinology. Boston: Little, Brown & Company, 1941, p. 49.
2. Ross, R. A.: Am. J. Obst. & Gynec., 45:497, 1943.
3. Cinberg, B. L.: Manual of Endocrine Therapy. Brooklyn: Chemical Publishing Company, 1941, p. 48.
4. Noyes, R. W.: West. J. Surg., 53:341, 1945.
5. Zóndek, B.: Personal communication.
6. Papanicolaou, G. W., and Trout, H. F.: Diagnosis of Uterine Cancer by the Vaginal Smear. New York: The Commonwealth Fund, 1943.
7. Meigs, J. V.: Am. J. Obst. & Gynec., 49:542, 1945.

FRANCIS AMORY SEPTENNIAL PRIZE

In compliance with the will of the late Francis Amory of Beverly, Massachusetts, the American Academy of Arts and Sciences will award in 1947 a substantial prize for outstanding work on the alleviation or cure of diseases affecting the human reproductive organs, provided work of sufficient merit has appeared during the current seven-year period.

No formal applications and no essays or treatises from individuals are solicited, but suggestions from any appropriate source that will be of aid to the Committee in making a wise selection will be welcomed. Recommendations may be addressed to the Secretary, Amory Fund Committee, American Academy of Arts and Sciences, 28 Newbury Street, Boston, Massachusetts.

VITAMIN D THERAPY IN THE TREATMENT OF SCLERODERMA AND ALLIED CONDITIONS: THREE CASES

C. Frederick Norman, M D., F.A C S.

THIS article reports the successful treatment of three cases of scleroderma, complicated by other conditions, by supplementing the function of the parathyroid glands with vitamin D administered orally. Vitamin D therapy, rather than parathyroidectomy as recommended by numerous investigators in the past (*7*, *23*, *27*, *42*, *43*), is suggested as the treatment of preference in these disorders accompanied by hyperfunction of the parathyroid glands.

These diseases are characterized by fibrosis and calcification of the soft tissues, notably by scleroderma. The existence of a basic similarity in several of these disorders, including Raynaud's disease and chronic arthritis, is suggested.

REVIEW OF THE LITERATURE

Leriche (*22*, *23*) considers scleroderma the cutaneous expression of hyperparathyroidism. He found that parathyroid hormone produced peripheral vasomotor disturbances of hypertonic type. However, Liuzzo (*27*) claims that the successes attributed to parathyroidectomy in scleroderma and ankylosing primary chronic arthritis cannot be assumed to function through calcium metabolism, and suggests another function of these glands. Liuzzo did not find hypercalcemia to be regularly present in scleroderma, and states that even hypocalcemia may occur.

It has been observed that these diseases do not occur to any considerable extent among certain peoples, notably the Australian bushmen, owing probably in part to their continual exposure to the sun, which provides the irradiation of the skin necessary to promote the production of vitamin D. The Eskimos also have a low incidence of these diseases, particularly in the far north (38). These people subsist partly on raw fish livers, which contain abundant vitamin D. In some civilized areas Eskimos suffer from severe arteriosclerosis, a disease not observed among those who live in the far Arctic regions.

In the animal kingdom these diseases are also rare. The fur of animals is naturally coated with certain oils containing sterols, which, when exposed

---

G. FREDERICK NORMAN, M.D., F.A.C.S., San Francisco, is on the staff of Mary's Help Hospital. His results in the treatment of scleroderma are vouched for by Dr. Wm. J. Kerr, Professor of Medicine, University of California, and an Associate Editor of GERIATRICS. Dr. Norman, a member of the California State Medical Society and of the American Medical Association, has done research in calcium and phosphorus metabolism.

FIG. 1. Case 1. Showing atrophy of the finger tips and sclerosis of the skin, with cracking and scaling.

to the ultraviolet light of the sun, are activated and could thus become a source of vitamin D.

Civilized man, however, covers his body with garments, restricts his diet to foods particularly deficient in vitamin D, and usually shields himself from exposure to direct sunlight, and thus brings upon himself certain disorders that result from the diminished supply of this necessary substance (6, 8, 29). The blood calcium becomes moderately depressed, and as a consequence the parathyroids are forced to increase their activity in order to maintain the blood calcium on a level consistent with physiological requirements. Their increased secretion in turn demineralizes the bone shafts—the calcium depots—and in the end may or may not succeed in raising the calcium level to the required 10 or 11 mg. Thus civilized man's way of living may be responsible for the widespread occurrence of these diseases.

A deficiency of vitamin D also causes a lowering of the plasma inorganic phosphorus. Some investigators maintain that as the phosphorus level rises above normal the parathyroids are stimulated to overactivity. This would seem to be the situation in renal rickets (41). Adult or chronic

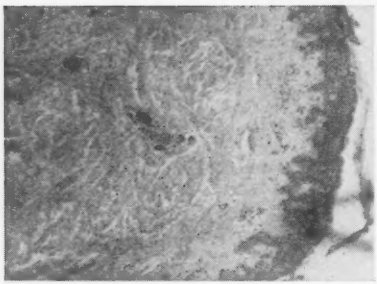


FIG. 2

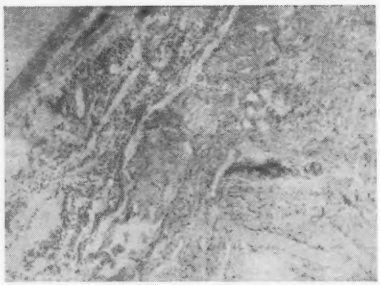


FIG. 4

FIG. 2. Case 1. Showing edema of collagen fibers, with sclerosis of the arterioles and round cell infiltration around the artery.

FIG. 4. Case 2. Showing round cell infiltration of muscle fibers, together with some infiltration around the artery, in addition to sclerosis.

rickets may result from such a series of events operating over a long period of years.

The literature dealing with the pathology of the parathyroids is somewhat vague and contradictory. Hypertrophy of these glands does occur in infant rickets and in chicks deprived of vitamin D and sunlight (33). Likewise, it has been reported in Raynaud's disease (6, 7), scleroderma (11), and arthritis (53). Parathyroidectomy has been practiced in such instances with varying success.

Observations in arteriosclerosis are meager, owing, probably, to the extreme chronicity of this disorder. In this connection, studies on mineral metabolism in old age (48) have revealed an increase in the serum calcium and magnesium and a decrease in phosphorus. Banks (3) suggests that vascular lesions in some of these entities are merely a manifestation of an underlying pathological process that frequently leads to morphologic changes in the small blood vessels.

Many successes are credited to the treatment of chronic arthritis with large doses of vitamin D (47, 49), and the use of this substance for such therapy no longer requires defence or elaboration. Cornbleet (11) and Maynard (30) have both employed vitamin D therapy successfully in the treatment of scleroderma patches. Early cases of Raynaud's disease have responded favorably to such treatment (34), especially when it is employed in conjunction with sex hormones.

In view of the high incidence of arthritis in woman at or after the menopause, the present author has undertaken studies to determine how vitamin D and the sex hormones affect the serum calcium and the inorganic phosphorus levels and the bone ash.

There are many relevant research studies. Thus the calcifying of frac-

tures with female hormone used as the therapeutic agent has been reported. Birds of both sexes exhibit an elevation of blood calcium when the female sex hormone is administered (13, 14, 21). However, the serum phosphorus of rats appears to be elevated by the female sex hormone and not by the male hormone (25). In these animals both female and male sex hormones operate to depress the blood calcium level.

The author has found that in rats both female and male sex hormones operate to depress the serum calcium level. The female hormone tends to close the epiphyses prematurely and increases the density of the bone shafts in the young of both sexes, with an indisputable increase in the percentage of bone ash. Tetany does not appear, but the parathyroid function is definitely depressed. Conversely, the male sex hormone delays epiphyseal closure, decreases the density of the bone shafts, and diminishes the pe centage of bone ash—results that suggest a stimulation of parathyroid activity. In other words, it is rachitogenic.*

Bastenie and Zylberszac (4, 5) have postulated from their experimental results on rats that estrogen operates to inhibit the activity of the parathyroid gland and progesterone increases it. This work was carried out in rats treated with colchicine by determining mitotic activity in the cells of these glands. Irradiated tachysterol has a similar effect.

Perfusion experiments (36) reveal that the use of decalcified blood leads to parathyroid hypertrophy and that a low-calcium diet, with the resulting hypocalcemia, induces marked parathyroid enlargement. Conversely, a low-phosphorus and high-calcium diet causes a significant reduction in volume of the parathyroids (9). As would be expected, increasing the dietary phosphorus, with the coincident hyperphosphatemia, induces a corresponding increase in parathyroid volume.

Viosterol inhibits the hypertrophy induced by low-calcium feeding, and also further reduces the size of these glands when they are already diminished by a low-phosphorus diet. At the same time, viosterol raises both the calcium and phosphorus levels in the serum. This effect might be explained as the result of an inhibition of parathyroid function by vitamin D, or simply as a substitution effect resulting in parathyroid inactivity. In this respect the calcium level is definitely more significant than the phosphorus level (15).

Report of Three Cases

In the three cases of scleroderma associated with other conditions here reported, the first two patients experienced amenorrhea during the course of the disease. They were not treated with estrogens in conjunction with vitamin D, as many of the author's arthritic patients have been. A basic similarity between their condition and that of such arthritic patients was noted. Treatment with vitamin D was carried out as shown in the accompanying figures. It will be observed that the amounts employed varied from

*Reports of these studies are in preparation.

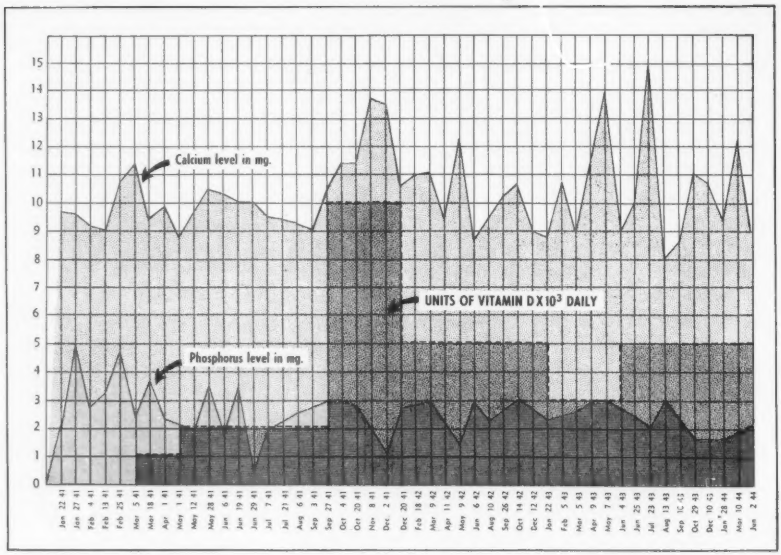


FIG. 3. Case 1. Showing serological results of vitamin D therapy.

fifty thousand to one hundred thousand units, and that the latter amount was the more usual.

CASE 1. V. B., a woman aged 34, complained on January 22, 1941, of induration of the skin over the entire body. The induration had begun two years before on her face, in a butterfly type distribution. All the body movements were limited, and the patient ate with difficulty, owing to the fixation of the facial integument. She was unable to walk and had to be carried in a fixed position from chair to chair. The finger tips had begun to atrophy (Figure 1), the skin was glossy and cyanotic, and the palms were cold and wet. Elbow and knee motion was limited to ten degrees. The face appeared masklike. In addition to the cutaneous induration and limitation of active and passive movements, the tendon sheaths were affected.

Early in the course of the illness dysphagia developed, with a desire to regurgitate immediately after taking food (26). Menstruation had ceased a year before. At no point on the body could a fold of skin be raised, and beneath the chin the skin was almost stony. The hands could not be closed, and the Achilles tendon was severely contracted on each side. Biopsy revealed a marked increase of collagen fibers, with sclerosis of the arterioles (18, 31), as illustrated (Figure 2).

Figure 3 shows the course of vitamin D therapy and the serological

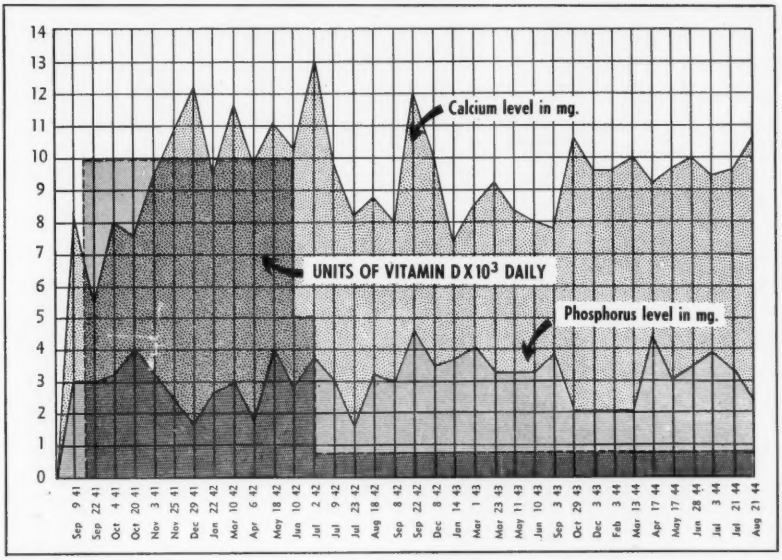


FIG. 6. Case 3. Showing serological results of vitamin D therapy.

results obtained. It is interesting to note that X-rays of the long bones were entirely irrelevant. Treatment was entirely successful, and the patient now leads a normal life. She does all the housework and shops for the family, and is able to board streetcars and buses with ease. Menstruation, which began one month after therapy was inaugurated, is again regular and heavy. Extension and flexion of the extremities are virtually complete. There is still a slight residual scaling of the face. The skin is pliable and warm, and dysphagia has completely disappeared.

CASE 2. J. S., a woman aged 32, a teacher, on September 9, 1941, complained of illness beginning two years earlier with a rash on her face, particularly on the nose. The ailment was then diagnosed by dermatologists as lupus erythematosus (3), and the patient was given injections of gold sodium thiosulfate. Fever developed, and gradually most of the joints apparently became partly ankylosed. The skin was generally indurated and the finger and toe tips took on an atrophic appearance. Feeding was difficult, owing to a pronounced dysphagia, with immediate regurgitation of a portion of the bolus. Menstruation had become very irregular and scant, and skipping of a month or two was common.

Biopsy was done by one of the specialists in charge at the time, and the case was diagnosed as dermatomyositis. It is interesting to note that

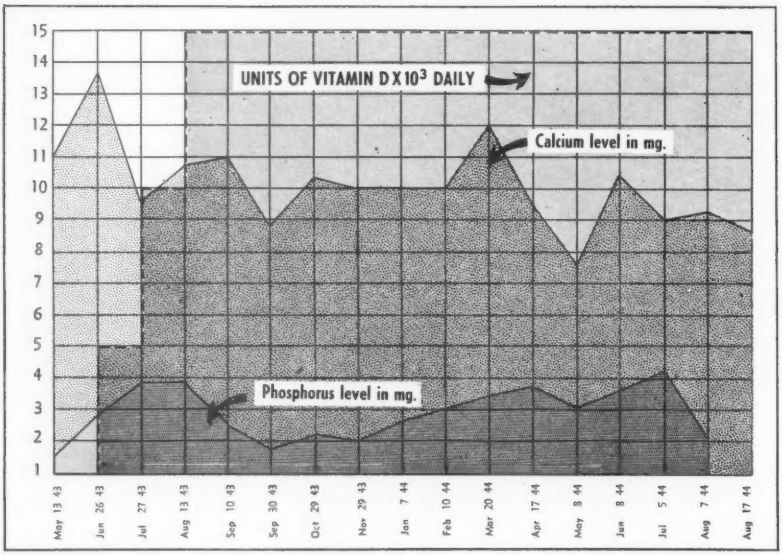


FIG. 5. Case 2. Showing serological results of vitamin D therapy.

there was a sclerosis of the arterioles with round cell infiltration and that the muscle fibers showed considerable edema (Figure 4).

X-rays revealed a generalized calcification of all large arteries. Brief interruption of treatment on two or three occasions resulted in the resumption of stiffness, and, more recently, in a painful hot swelling of the entire left wrist, aggravated by motion. X-rays demonstrated an intense arterial calcification, together with a calcified nubbin on the dorsum of the carpal bones and in the soft tissues. Resumption of the usual therapy—one hundred thousand units of vitamin D—resulted in rapid termination of the swelling and pain. A roentgenogram one year later, while the patient was still on the same treatment, shows tremendous reduction in the arterial calcification and complete disappearance of the calcific deposits described. The serological results of treatment are shown in Figure 5. The patient's blood pressure is normal. The urine shows a trace of albumin and a few casts. The patient's condition was further complicated by anemia of the primary type and of moderate severity, which responded to liver therapy.

The patient, recovered, is now engaged in her old occupation of teaching and has driven a Red Cross ambulance. There is no limitation of motion, the skin is entirely normal, and deglutition is perfect.

CASE 3. P. D., a woman aged 27, complained on May 13, 1943, of

generalized arthritis and induration of the skin which came on gradually after the age of 14 years and was characterized by many exacerbations. She was "stiff all over" and unable to dress herself, and walking was difficult.

The hands were markedly atrophic and deformed, with ankylosis of a number of terminal joints. The finger tips were atrophic and the palms damp and cyanotic. The nails were furrowed deeply in longitudinal direction. The entire skin was indurated and glossy without ulceration. There was no dysphagia. The motion of elbows, knees, ankles, and toes was much limited. No foci of infection could be demonstrated. Serum calcium was 10.8, serum phosphorus 1.5 mg. In addition to 50,000 units of vitamin D, the patient was treated for scant menstruation with 0.25 mg. of diethylstilbestrol daily.

Improvement was first noted in the skin, which became soft and pliable. The joints are now much improved, and the patient dresses herself and does light work. She is again able to wear regular shoes instead of slippers, and experiences much less pain. Figure 6 shows the changes in her serum. No alkaline phosphatase increase could be demonstrated, but there was a definite rise in phosphorus on therapy.

Summary and Conclusions

Three cases of sclerosis are presented, all with skin manifestations and apparently some muscle and tendon involvement. There was sclerosis of the arterioles and edema of the collagen fibers in the first two cases. The third patient exhibited a definite atrophic arthritis, in addition to cutaneous and subcutaneous manifestations. In all three patients the condition of the hands and feet resembled that in Raynaud's disease.

In all three patients improvement to the point of complete rehabilitation occurred, with restoration of normal skin and presumably normal condition of the arterioles. Where complete ankylosis had not ensued, joint involvement was markedly reduced, together with increase of active and passive movement and disappearance of pain.

It is suggested that chronic overfunction of the parathyroids constitutes a common denominator in scleroderma, dermatomyositis, chronic arthritis, Raynaud's disease (3), and arteriosclerosis. Such hyperfunction is presumably induced to maintain physiological plasma calcium and phosphorus levels, which in these conditions are defective, owing to inadequate intake of vitamin D and calcium or to the chronic lack of irradiation of the skin, the organ for the elaboration of the necessary vitamin.

A depression of ovarian function by these diseases is demonstrated. This function was promptly restored to normal, presumably by inhibiting the overactivity of the parathyroids. The reciprocal action between the ovary and these glands thus demonstrated offers confirmation of previous experimental work.

It is interesting to note that the effects of vitamin therapy on the

blood chemistry in these cases are not particularly impressive, although the phosphorus levels are somewhat low. Other investigators (40) have made similar observations. However, profound changes in the serum could hardly be expected, in view of the fact that compensation for deficiencies is maintained by the parathyroid apparatus at the expense of the bone shaft.

References

1. Albright, Fuller: Note on the Management of Hypoparathyroidism with Dihydrotachysterol. J.A.M.A., 112:2592 (June 24), 1939.
2. Aub, J. C.: Parathyroids Hormone Therapy. J.A.M.A., 105:197 (July 25), 1935.
3. Banks, Benjamin M.: Is There a Common Denominator in Scleroderma, Dermatomyositis, Disseminated Lupus Erythematosus, the Libman-Sacks Syndrome and Polyarteritis Nodosa? New England J. Med., 225:433-44 (Sept. 18), 1941.
4. Bastenie, P., and Zylberszac, S.: Action des Hormones Sexuelles sur la Parathyroïde de la rate. Compt. rend. Soc. de biol., 132:93-94, 1939.
5. Bastenie, P., and Zylberszac, S.: Influence de la tachystérine irradiée (AT 10 de Holtz) sur la parathyroïde de la rate. Compt. rend. Soc. de biol., 132:95-96, 1939.
6. Bernheim, Alice R.: Calcium Need and Calcium Utilization. J.A.M.A., 100:101 (April 1), 1933.
7. Bernheim, Alice R., and Garlock, J. H.: Parathyroidectomy for Raynaud's Disease and Scleroderma. Ann. Surg., 101:1012-16 (April), 1935.
8. Black, John R.; Ghormley, R. K.; and Camp, J. D.: Senile Osteoporosis of the Spinal Column. J.A.M.A., 117:2144-50 (Dec. 20), 1941.
9. Carnes, William H.; Pappenheimer, Alvin M.; and Stoerk, Herbert C.: Volume of Parathyroid Glands in Relation to Dietary Calcium and Phosphorus. Proc. Soc. Exper. Biol. & Med., 51:314-16, 1942.
10. Carnes, William H.; Osebold, John; and Stoerk, Herbert C.: Parathyroid Function in the Hypophysectomized Rat. Am. J. Physiol., 139:188-92, 1943.
11. Cornbleet, T., and Struck, H. C.: Calcium Metabolism in Scleroderma. Arch. Dermat. & Syph., 35:188-201 (Jan.), 1937.
12. Day, Harry G., and Follis, Richard H., Jr.: Skeletal Changes in Rats Receiving Estradial Benzoate as Indicated by Histological Studies and Determinations of Bone Ash, Serum Calcium and Phosphatase. Endocrinology, 28:83-92, 1941.
13. Doisy, E. A.: Estrogenic Substances. J.A.M.A., 116:501-5 (Feb. 8), 1941.
14. Farrow, Joseph H., and Woodward, Helen Q.: The Influence of Androgenic and Estrogenic Substances on the Serum Calcium in Cases of Skeletal Metastases from Mammary Cancer. J.A.M.A., 118:339-43, 1942.
15. Ham, A. W.; Littner, N.; Drake, T. G. H.; Robertson, E. C.; and Tisdall, F. F.: Physiological Hypertrophy of Parathyroids, Its Cause and Its Relation to Rickets. Am. J. Path., 16:277-86, 1940.
16. Ivanova, S. A.: Influence of Vitamin D and Parathyroid Hormone on Histogenetic Process of Healing of Bone Fracture. Compt. rend. Acad. d. sc. (U.S.S.R.), 31:714-16, 1941. (In English.)
17. Jackman, J.: Roentgen Features of Scleroderma and Acrosclerosis. Radiology, 40:164 (Feb.), 1943. Abstract, J.A.M.A., 122:261, 1943.
18. Jager, B. V., and Grossman, L. A.: Dermatomyositis. Arch. Int. Med., 73:271-85 (April), 1944.
19. Kahlau, H.: Epithelkarperschen und Kalkstoffwechsel. Frankfurt Zschr. f. Path., 54:494-531, 1940.
20. Kinosita, N.: Universal Scleroderma, Two Cases. (German.) Okayama-Igakkai-Zasshi, 53:53 (June), 1941. Abstract, J.A.M.A., Nov. 15, 1941.
21. Landauer, Walter C.; Pfeiffer, A.; Gardner, W. U.; and Shaw, J. C.: Blood Serum and Skeletal Changes in Two Breeds of Ducks Receiving Estrogens. Endocrinology, 28:458-64, 1941.
22. Leriche, R.: Hypoparathyroidism. Gaz. d. hôp., 109:209-13 (Feb. 12), 1936. Abstract, J.A.M.A., 106:1214 (April 4), 1936.
23. Leriche, R., and Jung, A.: Thymectomy and Parathyroidectomy in a Case of Dystrophy of the Puny Type and Generalized Calcinosis. Press. méd., 46:809 (May 21), 1938.
24. Leverton, William R.: Parathormone and Vitamin D: Calcium and Phosphorus Metabolism. M. Bull. Vet. Admin., 17:266-73 (Jan.), 1941.

25. LEVIN, L., and SMITH, E.: Is the Blood Calcium Level of Mammals Influenced by Estrogenic Substances? Endocrinology, 22:315 (March), 1938.
26. LINDSAY, J. R.; TEMPLETON, F. E., and ROTHMAN, S.: Lesions of the Esophagus in Generalized Progressive Scleroderma. J.A.M.A., 123:745 (Nov. 20), 1943.
27. LIUZZO, G.: Parathyroidectomy in Scleroderma. Policlinico, 47:41 (Jan. 15), 1940.
28. MCLEAN, FRANKLIN C., and BLOOM, WILLIAM: Calcification and Ossification. Mobilization of Bone Salts by Parathyroid Extract.
29. MAXWELL, J. PRESTON: Osteomalacia and Diet. Nutrition Abstr. & Rev., 4:1 (July), 1934.
30. MAYNARD, M. T. R.: Clinical Note on Scleroderma. California & West. Med., 50:365 (May), 1939.
31. MURPHY, J. R.; KRAININ, P.; and GERSON, M. J.: Scleroderma with Pulmonary Fibrosis. J.A.M.A., 116:499 (Feb. 8), 1941.
32. NEUFELD, A. H., and COLLIP, J. B.: The Primary Action of the Parathyroid Hormone. Endocrinology, 30:135-41, 1942.
33. NONIDEZ, J. F., and GOODALE, H. D.: Histological Studies on the Endocrines of Chickens Deprived of Ultraviolet Light. I. Parathyroids. Am. J. Anat., 38:319 (Jan. 26), 1927.
34. NORMAN, G. F.: Blood Calcium; Its Relation to Certain So-Called Angiospastic Conditions. West. J. Surg., 46:553-58 (Oct.), 1938.
35. PANTSEVICK, I. S.: Changes in the Calcium Content of the Blood of Gynecological Patients in Relation to Calcium Therapy. Med. zhur., 35; No. 5-6: 95-101, 1939.
36. PATH, HARVEY M.; WALLERSTEIN, ELIZABETH; and LUCKHARDT, ARNO B.: Humoral Control of Parathyroid Secretion. Proc. Soc. Exper. Biol. & Med., 49:580-82, 1942.
37. PICKHARDT, O. C., and BERNHARD, A.: Treatment of Postoperative Tetany with Dihydrotachysterol. Ann. Surg., 108: 362-73 (Sept.), 1938.
38. RABENOWITCH, J. M.: Clinical and Other Observations on Canadian Eskimo in the Eastern Arctic. Canad. M.A.J., 34:487-501, 1936.
39. RAMSDELL, E. G.: Calcinosis Universalis. West. J. Surg., 43:624-35 (Nov.), 1935.
40. REED, C. I.; STRUCK, H. C.; and STECK, I. E.: Vitamin D; Chemistry, Physiology, Pathology, Experimental and General Investigations. Chicago: University of Chicago Press, 1939.
41. SCHELLING, DAVID H.: Parathyroids in Health and Disease. St. Louis: C. V. Mosby Company, 1935.
42. SHKUROV, B.: Treatment of Chronic Rheumatic Polyarthritis and Spondyl-arthritis by Parathyroidectomy. J. Bone & Joint Surg., 17:571-76 (July), 1935.
43. SHKUROV, B. I., and ELENEOSKIY, K. E.: Histologic State of Parathyroids in Chronic Rheumatic Polyarthritis and Spondyl-arthritis. Ortop. i. travmatol. Abstract, J.A.M.A., 105:325 (July 27), 1935.
44. SELYE, HANS: Mechanism of Parathyroid Hormone Action. Arch. Path., 34:625-32, 1942.
45. SOS, J.; LICHNER, G.; and ATS, M.: Effects of Estrogenic Compounds and Lack of Vitamin D on the Calcium and Phosphorus Content of Bones. (German.) Arch. f. exper. Path. u. Pharmakol., 197:271-74, 1941.
46. SNYDER, FRED H., and TWEEDY, WILBUR R.: Effect of an Anterior Hypophyseal Extract on Serum Calcium and Phosphorus. Proc. Soc. Exper. Biol. & Med., 47:234-36, 1941.
47. SNYDER, R. GARFIELD; SQUIRES, WILLARD; FORSTER, JOHN; TRAEFER, CORNELIUS; and WAGNER, LEWIS C.: The Treatment of 200 Cases of Chronic Arthritis with Electrically Activated Vaporized Sterol. Indust. Med., 2:295-313, 1942.
48. TUROVETS, I. M., and PRAVDINA, L. I.: Interchange of Substances in Aged Subjects. J. Med. Ukraine, 8:819-26, 1938.
49. WAGNER, LEWIS: Orthopedic Report; Evaluation of Arthritis Cases Treated by Vitamin D Indust. Med., 11:313-16, 1942.
50. WALKER, TAYLOR C.: Use of Testosterone Propionate and Estrogenic Substance in Treatment of Essential Hypertension, Angina Pectoris, and Peripheral Vascular Disease. J. Clin. Endocrinol., 2:560-68, 1942.
51. WEBER, FREDERICK C., JR., and RICHARDSON, HENRY B.: Dihydrotachysterol (A.T. 10) and Mineral Metabolism; A Metabolic Study. J. Clin. Endocrinol., 1:32-37, 1941.
52. WENNER, N. J.: The Hamilton-Schwartz Test and Hyperparathyroidism in Various Diseases. Am. J. M. Sc., 202:642-50, 1941.
53. WOOTON, W. T.: Parathyroids in Relation to Chronic Arthritis. J. Missouri M.A., 33:129 (April), 1936. Abstract, J.A.M.A., 106:1854 (May 23), 1936.

THE WECHSLER-BELLEVUE SCALE IN INDIVIDUALS PAST SIXTY

M. J. Madonick, M.D., and Marian Solomon, M.S.

In view of the rather meager psychometric data on old people based upon tests with the Wechsler-Bellevue scale, we report here the results with this scale in fifty cases.

The subjects, men and women between the ages of 60 and 85, lived in two homes for the aged. None were incapacitated by motor or sensory disorders, and all were ambulatory. In all, 53 were tested, but three were excluded because of poor vision, which prevented successful completion of the tests. We believe Kent's (1) criticism that the Wechsler-Bellevue test places an undue visual strain upon older people is valid. The only physical condition that may have played a role in the results was arteriosclerosis, often present in this age group (2). All the subjects were able to understand and speak English well. Those born abroad had been in the United States for many years.

It may be maintained with some reason that the people in these two homes were rather selected groups. One home was run on a denominational basis (Baptist), and the inmates of the other were former successful executives and professionals now in financial straits. However, it is extremely difficult to collect ideal statistical groups, and we believe this study should be of interest despite its limitations.

Numerous different tests on elderly people, some part and some full scale, have been employed by various investigators, who have arrived at diverse conclusions. Gilbert (3) studied the memory of 174 people between the ages of 60 and 69 and a control group between the ages of 20 and 29 with a revision of the Babcock test. She found the vocabulary to be rather stable. When not weighted for time, the difference between the scores of 60 year olds and 20 year olds in the naming of opposites and in the learning of paired associates decreases; the opposites, which are closer to simple vocabulary, show the least deterioration, while the paired associates remain among the tests showing the greatest loss.

Mental Changes with Aging

Hebb (4, 5) stated that adult deterioration is least in vocabulary, information, and verbal comprehension, and greatest in speeded tasks, abstract problem solving, and unfamiliar performances.

M. J. Madonick, M.D., Instructor in Neurology, College of Physicians and Surgeons, Columbia University, is Associate Neuropsychiatrist, Morrisania City Hospital, and Adjunct Neuropsychiatrist, Montefiore Hospital, New York.
Marian Solomon, M.S., psychometrist, administered the Wechsler-Bellevue Scale in the study reported.

Shakow and Goldman (6), who employed the Stanford-Binet vocabulary, state that persons of very high intelligence usually maintain high vocabulary scores until the eighth decade, while the scores of those of average intelligence drop several decades earlier. Grace (7) and Brody (8, 9) also reported the preservation of vocabulary until an advanced age.

Ruch (10) studied forty persons between 60 and 82 years of age. Of the motor tasks, the mirror vision variant showed the greater deficit in older subjects as compared with the younger ones. With the verbal learning tasks the decline in ability of the aged increased in the following order: paired associates, nonsense materials, false products.

Miles (11) investigated 320 people between the ages of 50 and 69 and 130 between 70 and 89 years of age. He found perceptive ability to fall rapidly from age 60 and the decrement of learning ability to be as great as the decline of sensory capacity. The same author (12) reported that when the Otis test is given under conditions permitting the subject to spend an unlimited amount of time on each item, the decline with age is less than in the case of Otis scores obtained with a strict time limit. Lorge (13, 14) gave a number of intelligence tests with time limits and the CAVD with unlimited time to 143 subjects from 20 to over 70 years of age. The results obtained suggested that time limits tend to place older individuals at some disadvantage.

Kubo (15), who worked with subjects between 70 and 100 years of age, reported that rote memory does not show a sudden fall until the age of 82; after that age it declines rapidly. Gilbert (16) stated that mental decline is slower in the more intelligent and better educated.

Wiersma (17) believed that mental functions remain unimpaired to a very advanced age in those gifted in earlier life with lively interests. Miles and Miles (18) also demonstrated that the decline in intellectual abilities with age is smaller in the higher educated group.

Jones and Conrad (19) employed the Army Alpha test in 1191 unselected subjects between 10 and 60 years of age. It is noteworthy that tests of information failed to show a postadolescent decline. The decline was most rapid in the subtests of analogies, "common sense," and numerical completion. In the sixth decade, they stated, about 40 per cent of the total alpha is derived from two tests which at age 10 contribute only 25 per cent of the total score. The effective intellectual power of the adult, to a much greater degree than that of the 10 year old, is evidently derived from accumulated stocks of information.

Yacorzynski (20) pointed out that vocabulary scores may be maintained in later maturity chiefly because there are many different and acceptable ways of defining words. Thus, deterioration may have eliminated some of the more difficult definitions or more elaborate contextual meanings without disturbing the score obtained by the older person. If attention were given to the process of defining words rather than to end results, somewhat different

inferences might be drawn. This point is similar to Goldstein's (21) observation that brain lesions which fail to destroy the ability to solve a problem may nevertheless profoundly influence the method by which the correct solution is arrived at.

Willoughby (22) found declines in completion, analogies, and opposites but not in arithmetic, with increasing age. Foster and Taylor (23) investigated with the Yerkes-Bridges point scale 106 persons between 50 and 84 years of age who were patients in a general hospital but had no mental disorder. They found in general a falling off of the total score with advancing age. This decline was most marked in drawings from memory, dissected sentences, three words in one sentence, and words given in three minutes. The fall was least marked in aesthetic comparison, missing parts, comparison of lines and weights, counting backwards, and absurdities.

Weisenburg, Roe, and McBride (24), who studied persons somewhat below the age of 60, found little decline in vocabulary, reading, spelling, and arithmetic tests.

Werner (25) tested ten men and women between the ages of 63 and 83, who were in a home for the aged, on Knox cubes, digit memory span, Porteus mazes (10 to 14), and substitution and paired associates. The group equaled the Army group on the first two, but showed a decline on the mazes, a marked decline on the substitution, and complete failure on the paired associates. The author concluded that the group was probably originally above the mean of the Army group and had declined.

Sorenson (26) studied a group of 641 adults, eleven of them over 60 years of age, who had equivalent years of schooling and occupational status and were attending college courses. Under these conditions the age curves for vocabulary ability went up with age, while the age curves for paragraph-reading ability remained stationary.

Mursell (27), who used the Kuhlmann-Binet and Kuhlmann-Anderson tests with reformatory inmates aged 10 to 74, in five-year groups, found a steady decrease in the IQ, from about 90 in the mid-twenties to 67 in old age.

Wechsler (28), studied 85 persons past 60 with the Bellevue test to derive his curve of intelligence. He listed (p. 66) tests which "hold up with age," namely, information, comprehension, object assembly, and vocabulary. The tests that showed a conspicuous age decline were tests of digit span, arithmetical reasoning, substitution, block design, and similarities.

Halstead (29) investigated twenty less seriously demented patients between 68 and 83 years of age in three London mental hospitals. He used 25 items, including four from the Wechsler-Bellevue scale. Estimation of the IQ from the three Bellevue verbal tests gave an average of 106. A rough estimate of the IQ on the same tests at the peak ages of 20 to 24 gave a figure of 113 ± 8. Most difficult were those in which the subjects were required to break away from old mental habits and adapt to unfamiliar situations, tests of recent memory (logical), and tests of judgment, planning, and rea-

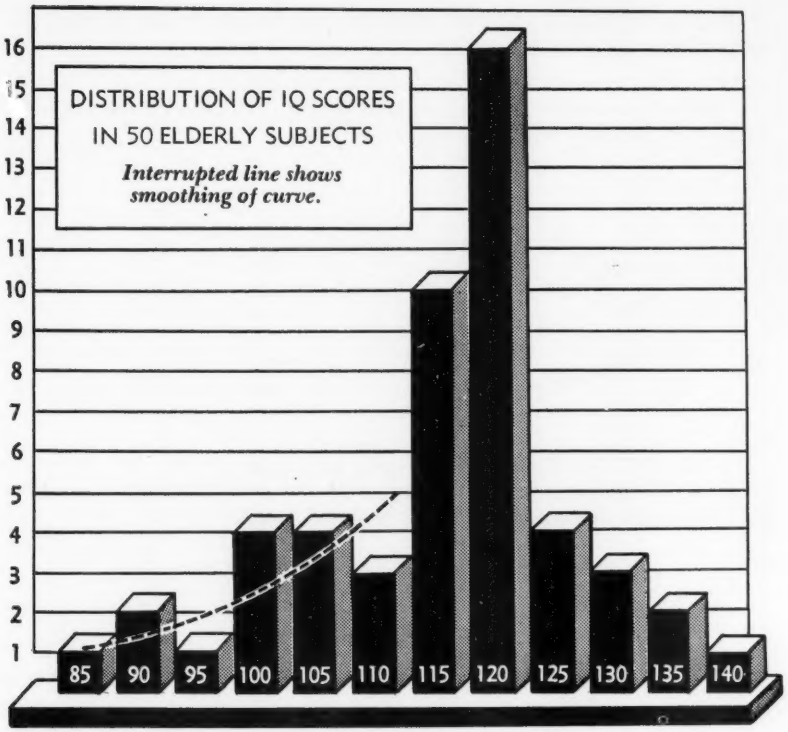


FIG. 1. Showing the distribution of IQs in 50 subjects aged 60 to 85. (Interrupted line shows smoothing of curve.)

Erratum: IQ 120 column should read 15, not 16.

soning. Less difficulty was found with tests of rote memory, fluency of associations, simple arithmetic, and vocabulary. Performance seemed to be least affected on tests of visual recognition, old mental habits, and simple motor tasks. The correlation of –.268 between scores on full scale and age within the group gives some indication of the more rapid fall of function in old age. This author (Halstead) found a correlation of little more than zero on a number of adult tests between the ages of 20 and 45.

Rabin (30) employed the Wechsler-Bellevue scale with twenty-five nonpsychotic persons aged 60 or over in a state hospital. The highest scores were obtained on verbal and untimed power tests, the lowest on timed performance tasks. The mean IQ was 68.3. Rabin found no significant changes with age in patterning in the various subtests. Thus, his findings fail to confirm

Wechsler's division of tests into those that do and those that do not hold up with age.

Findings in the Present Study

Table 1 shows the age and sex distribution in decades of our subjects. Table 2 shows their former occupations.

Table 1
AGE AND SEX DISTRIBUTION OF SUBJECTS

Age	*M*	*F*
60-69	4	12
70-79	12	16
80+	5	1
Total	21	29

Table 2
FORMER OCCUPATIONS OF SUBJECTS

Occupation	*Number*
*Professionals	16
Clerks and businessmen	10
Housewives	9
Musicians	5
Seamstresses	4
Skilled workers	3
Salesmen	3
Total	50

*Physicians, engineers, and teachers.

Figure 1 shows the curve of the IQs, which ranged between 85 and 140, or higher than the figures obtained by Rabin with the same scale. However, as we have stated, our subjects were probably more selected than Rabin's, who, though nonpsychotic, were inmates of a mental hospital.

Our results show virtually no difference between the verbal and performance parts of the scale, the means being respectively 117.1 and 115.6. Although we gave the vocabulary test to each subject, and most of them did very well with it, the results were not used to calculate the IQ.

Table 3 shows the order of performance on the various tests, from best to poorest, as compared with the results in Wechsler's and Rabin's series.

In our series the information, comprehension, similarities, and object assembly tests were performed best. These results conform with both Wechsler's and Rabin's findings. The picture arrangement and digit symbol tests were most poorly performed. This result again agrees with the findings of

TABLE 3

ORDER OF PERFORMANCE ON TESTS: THREE SERIES

Test	*Our Series (Ages 60-85)*	*Rabin's Series (Ages 60 and over)*	*Wechsler's Series (Ages 45-49)**
Information	1	1	1.5
Comprehension	2	2	1.5
Similarities	3	3	3
Object Assembly	4	6	5
Arithmetic	5	5	4
Digits	6	4	8
Block Design	7	7.5	7
Picture Completion	8	7.5	6
Picture Arrangement	9	9	9
Digit Symbol	10	10	10

*Highest age group in Wechsler's series.

Wechsler and Rabin. The digits test, however, was in a somewhat lower position as compared with that in Rabin's series, and somewhat higher than in Wechsler's group, while picture completion was lower and object assembly somewhat higher than in Wechsler's group.

SUMMARY AND CONCLUSIONS

Fifty ambulatory men and women aged 60 to 85, living in two homes for the aged, were tested with the Wechsler-Bellevue scale. The IQs ranged between 85 and 140, or somewhat higher than in Wechsler's and Rabin's series, owing, possibly, to some selectivity in our series. Other factors that may account for the difference are that the tests may be weighted too much for older people and that in homes for the aged common interests appear to stimulate the intellectual capacity of the residents. The verbal and performance parts of the test held up equally well. Highest performance was achieved in the information, comprehension, and similarities tests, and lowest in the picture arrangement and digit symbol tests. Our series showed some differences in achievement in the other subtests as compared with Wechsler's and Rabin's groups.

ACKNOWLEDGMENTS

The authors wish to thank Dr. E. H. Rubin and Dr. F. A. Wurzbach, Jr., medical directors of the Andrew Freedman Home and the Baptist Home for the Aged, respectively, New York City, for permission to use the facilities of these institutions in carrying on the study here reported.

REFERENCES

1. KENT, G.: Wechsler, D., The Measurement of Adult Intelligence. (A Review.) Psychol. Bull., 37:251, 1940.
2. OPHÜLS, W.: *In* COWDRY, E. V.: Arteriosclerosis. New York: The Macmillan Company, 1933, p. 249.

3. GILBERT, J. G.: Memory Loss in Senescence. J. Abnorm. & Social Psychol., 36:73, 1941.
4. HEBB, D. O.: Clinical Evidence Concerning the Nature of Normal Adult Test Performance. Psychol. Bull., 38:593, 1941.
5. HEBB, D. O.: The Effect of Early and Late Brain Injury Upon Test Scores and the Nature of Normal Adult Intelligence. Proc. Am. Philos. Soc., 1942.
6. SHAKOW, D., and GOLDMAN, R.: The Effect of Age on the Stanford-Binet Vocabulary Score of Adults. J. Educ. Psychol., 29:241, 1938.
7. GRACE, A. G.: Individual Differences in Adults. J. Educ. Psychol., 23:179, 1932.
8. BRODY, M. B.: A Note on the Use of the 1937 Revision of the Stanford Binet Vocabulary Test in Mental Hospital Patients. J. Ment. Sc., 86:532, 1940.
9. BRODY, M. B.: The 1916 Stanford Binet Vocabulary Test Revised for Rapid Routine Practice. J. Ment. Sc., 87:88, 1941.
10. RUCH, F. L.: The Differentiative Effects of Age Upon Human Learning. J. Gen. Psychol., 11:261, 1941.
11. MILES, W. R.: Age and Human Ability. Psychol. Rev., 40:99, 1933.
12. MILES, W. R.: Psychological Aspects of Ageing. *In* Cowdry, E. V.: Problems of Ageing. 2d edition; Baltimore: Williams & Wilkins Company, 1942.
13. LORGE, I.: The Influence of the Test Upon the Nature of Mental Decline as a Function of Age. J. Educ. Psychol., 27:100, 1936.
14. LORGE, I.: Psychometry: The Evaluation of Mental Status as a Function of the Mental Test. Am. J. Orthopsychiat., 10:56, 1940.
15. KUBO, Y.: Mental and Physical Changes in Old Age. J. Genet. Psychol., 53:101, 1938.
16. GILBERT, J. G.: Mental Efficiency in Senescence. Arch. Psychol., No. 188, 1935.
17. WIERSMA, E. D.: Psychology of Dementia. J. Ment. Sc., 76:1, 1930.
18. MILES, C. C., and MILES, W. R.: The Correlation of Intelligence Scores and Chronological Age from Early to Late Maturity. Am. J. Psychol., 44:44, 1932.
19. JONES, H. E., and CONRAD, H. S.: The Growth and Decline of Intelligence: A Study of a Homogeneous Group Between the Ages of Ten and Sixty. Genet. Psychol. Monogr., 23:213, 1933.
20. YACORZYNSKI, G. K.: An Evaluation of the Postulates Underlying the Babcock Deterioration Test. Psychol. Rev., 48:261, 1941.
21. GOLDSTEIN, K.: Aftereffects of Brain Injuries in War. New York: Grune & Stratton, 1942.
22. WILLOUGHBY, R. R.: Family Similarities in Mental Test Abilities. Genet. Psychol. Monogr., 2:235, 1927.
23. FOSTER, J. C., and TAYLOR, G. A.: The Applicability of Mental Tests to Persons Over 50 Years of Age. J. Appl. Psychol., 4:39, 1920.
24. WEISENBURG, T., ROE, A., and MCBRIDE, K. E.: Adult Intelligence: A Psychological Study of Test Performances. New York: The Commonwealth Fund, 1936.
25. WERNER, H. M.: Some Psychological Tests of the Aged. Master's Thesis. 4th edition; New York: Columbia University, Department of Psychology, 1932.
26. SORENSON, H.: Mental Ability Over a Wide Range of Adult Ages. J. Appl. Psychol., 17:729, 1933.
27. MURSELL, G. R.: Decrease in Intelligence with Increase in Age Among Inmates of Penal Institutions. J. Juv. Research, 13:197, 1929.
28. WECHSLER, D.: The Measurement of Adult Intelligence. Baltimore: Williams & Wilkins Company, 1939.
29. HALSTEAD, H.: A Psychometric Study of Senility. J. Ment. Sc., 89:363, 1943.
30. RABIN, A. I.: Psychometric Trends in Senility and Psychoses of the Senium. J. Gen. Psychol., 32:148, 1945.

The unlearned lose the power of clear thinking as they grow old, but scholars gain in it as their years advance.—KINNIM.

THE BASIC FACTORS OF NUTRITION IN OLD AGE

Joseph T. Freeman, M.D.

FOUR small essays by Luigi Cornaro (1467-1566), in which he reviews several decades of careful application to a hygienic mode of living, comprise an intensely personal basis for a dietary regimen in old age. Choleric and frail in his youth, as he relates, indulgent of self in a manner befitting a Venetian gentleman of his day, Cornaro was old at forty, when the desire to recover his health led him to become an apostle of abstinence. Tintoretto's portrait of Cornaro in the Pitti Palace, reproduced in the American translation of his *Dorsi sulla vita sobria,* shows the successful results he achieved. He wrote the first essay at 83, the last at 95, and lived to be 98.

Cornaro gives only the briefest description of his nutritional scheme. He recommends bread, broth, eggs, veal, kid or mutton, poultry, and fish, with spices, to a total quantity of 12 to 14 ounces daily, and 14 to 16 ounces of wine. Analysis of this diet reveals a daily intake of 1000 calories, consisting of 110 grams of carbohydrate, 86 grams of protein, and 30 grams of fat.

Influential as such writings were, the subjective approach has been supplanted by a splendid scientific literature on nutrition of the aged. Many aspects of the subject have been investigated: the influence of heredity, early and late guidance, determination of the proper essentials of diet, recognition of psychic strains, the physiological adjustments of the older organism, and realization of the effect of somatic disharmonies on nutritional status and capacity.

Unfortunately, there is still a hiatus between this medical knowledge and public understanding and acceptance of it. A faddist, singing his one monotonous note, has more following than do students of nutrition, whose controlled studies are couched in more conservative tones. Completion and verification of final objective observations and public education in such matters will be essential to obtain the same wide audience that Cornaro's little book (1) commanded in an earlier time.

It is strange that nutrition in relation to all other periods of life had been studied before interest was focused on the later years. There has been more concern with youth, when there is physiological elasticity with which to deal with the results of indiscretion, than with age, when an error or deficiency may upset the entire physiological equilibrium. There is need for a consideration of all phases of the problem of nutrition in old age.

JOSEPH T. FREEMAN, M.D., Instructor in Medicine and Lecturer in Geriatrics, Woman's Medical College of Pennsylvania, is also Visiting Physician in Geriatrics, Doctor's Hospital of Philadelphia. He is a graduate of Jefferson Medical College.

Anatomical Changes

The purely oral aspects of nutrition in old age have received proper attention. Good dental care and replacement, with their influence on the desire and ability to eat properly, are reflected immediately in better eating habits. Reduction in the integrity of the buccal musculature with advancing years may be compensated for by a change in the nature of the food. The slight progressive atrophy of the lingual mucosa may influence taste acuity.

The muscular tube of the gastrointestinal tract, with its secretory surface, undergoes two main changes—a reduction in the number of effective secretory units and a loss in muscle tonus. These changes are not sufficient to cause any considerable impairment of function, since the anatomical reserve of the older body is sufficient to handle the refined modern diet.

More important than the slight changes in the primary smooth muscles is the loss of efficiency due to impairment of the supplementary supporting voluntary muscles. A relaxed abdominal wall with resulting visceroptosis, a muscular defect with a large herniation, or a sagging perineal support may nullify the efforts of otherwise fairly well-preserved parts. The frequency of esophageal hiatal states or of temporary interruption of the duodenal lumen by the weight of the mesenteric stem crossing its horizontal portion, as well as increased deposits of fat in the subserosa and in the stretched omentum, are other possible anatomical hindrances to good function in old age. The cellular and intercellular modifications of the older pancreas and liver would seem to impair their functional capacity (2).

It is generally held that the small intestines and colon are subject to mucosal atrophy, muscular thinning, and loss of muscle tone. These modifications are associated with intestinal vascular sclerosis, a degenerative involvement of the mesenteric vessels which is almost wholly a characteristic of advanced years (3). This reduction in blood supply is associated with impaired venous return. Increased venous pooling in the abdominal cavity has implications going beyond those related solely to the digestive organs. Hemorrhoids and prominent veins on the abdominal wall or in the legs are obvious indications of such vascular limitations.

Finally, changes in neural capacity, in line with other known nerve tissue changes, can be expected as a part of the changed anatomical picture in old age. Small wonder, then, that digestion in the elderly is not the same as digestion in youth (4). It is not so much that the old have so little to work with as that the young have so much. A frugal utilization of hoarded reserves by the old body permits it to function with a relative degree of normality, as long as an equilibrium can be maintained.

It may be concluded that in old age the body operates on a pattern of economy, or of simple adequacy of parenchyma and muscles, without the waste so characteristic of youth. While youth spends with prodigality, as from an open purse, the older person spends from one the clasp of which must be opened with conscious effort.

Physiological Limitations

Van Liere (5) has shown that the older stomach is emptied in an average of 1.94 hours, as compared with 2.08 hours for a younger control group. Evidently progressive pathological changes are not manifested in the functioning of this organ. No studies on the total time of transmission of food through the alimentary tract have been reported. Constipation, which is primarily rectal, owing to arrest in the atonic rectal ampulla, may give the impression that this time is longer in old age, but there is no evidence for such an assumption. It is more likely that there is no difference in this respect, and that there is little need for changing the diet from one requiring mainly muscular effort to one in which digestion is effected almost solely by chemical means.

The chemistry of the older gastrointestinal system has been well described. Studies in this field started, quite naturally, with the enzymes of the saliva. Meyer and his co-workers showed that in young persons the saliva contained about 10 units of ptyalin, as compared with but 0.3 units in older persons. After stimulation of the salivary glands 14 cc. of saliva of a specific gravity of 1.004 were produced by young persons, whereas older ones could produce only 5.8 cc. of a mucoid secretion having a specific gravity of 1.009. Aside from the effects on oral moisture and food lubrication, starch digestion in the older mouth is greatly impaired by these changes.

Both the total quantity of gastric secretion and the individual chemical components are modified. The incidence of achlorhydria in the aged has been reported as being from 23.9 per cent (7) to 65 per cent (8). In a group in which this condition existed in the resting stomach in 35 per cent of those studied, there was failure to respond to histamine in 28 per cent (9). Such an absolute loss of response is of greater significance than achlorhydria alone. It would seem that the ability to decrease the bulk of food as well as to sterilize it is diminished in relation to the change in gastric acidity. Such variations, however, have no effect on gastric emptying time (5).

After age 60 the amount of pepsin in the resting older stomach shows a steady decline. After age 70 there is a sharp drop to a low level which is maintained thereafter (8). Analysis of the fasting duodenal contents reveals a drop in the trypsin level of older persons in the resting state, but upon stimulation the older pancreas yields the same amount of this enzyme as that found in younger persons (8).

Unlike the proteolytic enzymes, lipase is lower in both the fasting and the stimulated phases. That is, there is an absolute loss of function, in contrast to the guarded production of other enzymes. This type of difference defines the nature of the diet to be adopted (8).

In the fasting state pancreatic amylase is lower in older persons than in younger ones, but the response to stimulation is so active that this enzyme suffices not only for its own place in the digestive cycle but also to compensate for the reduction in salivary amylase (6, 8).

To summarize, the characteristic physiological reaction in later life is a condition of minimal rather than maximal reactivity. However, as long as functional integrity persists an adequate response may be produced with the proper stimulation.

The factors of time and load in digestion must also be considered. A low amount of digestive substance, if given a longer period to operate and a smaller amount to work upon, can accomplish a degree of digestion equal to higher levels acting on greater intake and over a shorter period of time. Under such conditions lower levels of such substances as lipase or pepsin will not reveal obvious impairment in the chain of absorptive mechanisms. This conclusion is keynoted by the fact that intestinal absorption as tested with galactose is slower (4), but complete.

Functional Tests

Possible disparities between digestive absorption and utilization are shown by organ function tests. The normal wide range of adaptation inherent in the liver would suggest that it is quite able to handle any reasonable diet. Even the older gallbladder can persist as a useful organ in the nutrition cycle. Using the cephalin flocculation and bromsulfalein tests, estimations of the total and free serum cholesterol, and measurement of the hippuric acid metabolism, Rafsky and Newman (10) studied liver function in fifty normal older individuals. In 86 per cent of the group one of these determinations was unsatisfactory; in 26 per cent two tests showed impairment; in 2 per cent, three; and in 26 per cent all the tests used indicated hepatic dysfunction. None of these persons had a clinical picture that would suggest such limitations. It was concluded that "abnormal results of liver function tests may be encountered in apparently healthy subjects above 60 years of age."

Pancreatic and contributory factors were investigated by glucose tolerance. In pointing out the homeostatic mechanisms of older age, Cannon (11) showed that there was a reduction in the tolerance of glucose to such a degree that a diabetic type of curve was found in 50 per cent of subjects over 60. "In temperature regulation," he states, "in the storage and use of sugar in the body, and in the maintenance of the acid-base balance of the blood the homeostatic mechanisms when subjected to stress are revealed to be more limited in their ability to preserve uniformity of the internal environment as life advances into the last decades." It might be added as a qualification that the stress itself is the stimulus which makes for a response better than would seem possible with the physical material available.

A study (12) of 154 older patients showed a delayed glucose tolerance curve in 27.8 per cent and a mild diabetic curve in 19.4 per cent, "both considered significant for diminished sugar tolerance." These same persons, when studied two years later, showed a progressive reduction in glucose tolerance. A study (13) of fasting blood sugar showed 60 per cent to be in the

normal range, with 10 per cent hypoglycemic and 30 per cent hyperglycemic. The conclusion that "carbohydrate metabolism as measured by blood sugar curves is definitely impaired in old age" seems warranted (14). Although the digestion and absorption of carbohydrates proceeds without major hindrance, the older system lacks the power of normal utilization. The prolonged tolerance test may serve as an indication of the delayed physiological curve in later life.

Chemical Analyses

In a study (15) of 54 patients aged 64 to 95, 12 per cent were found to have a blood cholesterol level below 150 mg. per cent; 28 per cent were in the range of 150 to 200 mg. per cent, and 60 per cent were above 200 mg. per cent, with 14 per cent of these exceeding 300 mg. per cent. Sonnenberg and his co-workers (16) found the blood cholesterol level to be fairly constant throughout life, although in later years more lipids and cholesterol are deposited in the walls of the blood vessels. The average cholesterol level for both sexes was 214 mg. per cent, with a higher range in females than in males, despite the fact that the males had a higher incidence of atherosclerosis. In females only did the higher cholesterol level seem to be related to changes in basal metabolism (16). In another series (17) the average serum cholesterol was 238 mg. per cent, and was somewhat higher in males; the free cholesterol totaled 39 per cent. These higher figures indicate difficulty in the utilization of sterols. McCay (18) suggests that this difficulty may be due to pathological processes rather than to impaired utilization.

Repeated observations of the comparative calcium, phosphorus, and phosphatase fasting levels have shown no major changes in old age. A calcium and phosphorus balance can be maintained on a daily intake of 520 mg. of calcium and 1200 mg. of phosphorus (19). In Lespagnol's group 58 per cent had a calcium range of 9 to 11 mg. per cent, with 20 per cent falling below the lower figure and 22 per cent rising above the maximum (15). These figures indicate the extremes to which the body will go to maintain a state of equilibrium. Thus, it will even draw on its stored reserves in the bones, to the point of osseous impairment, in order to avoid a disturbance of the essential blood level.

The frequency of localized tetanic manifestations in older individuals, as shown in the occurrence of leg cramps at night, when the calcium excretion is higher than during the day, indicates the slight margin of calcium reserve in the aged and the need for more utilizable calcium in the diet. The same phenomenon is seen in the growing child and in the pregnant woman. A calcium tolerance test would be more indicative of the actual state of affairs than comparative fasting observations. Such observations merely verify the fact that the body has made a successful attempt to maintain its equilibrium—the typical response to stimulation—while an investigation of the stresses undergone would show at what cost of effort and effects on other systems equilibrium was maintained.

Uric acid, nonprotein nitrogen, and renal function tests have shown that "serious degrees of impairment of renal function are not a necessary accompaniment of old age" (20). From such studies many inferences may be drawn concerning the end results of protein metabolism.

Investigation has revealed no particular modifications of the blood with succeeding decades; the white cells are stable and the red cells show only slight change (21, 22). In Fowler's patients achlorhydria did not cause a lowering of the blood hemoglobin (7).

Nutritional Requirements in Old Age

Following this brief review of the organs and their functions, we may evaluate the place of the accessory food substances in the nutritional requirements of the older individual. Too often good nutrition has been confused with ingestion of abundant vitamins, without consideration of caloric needs and the intake of the three major food elements in the proper proportions. From the extreme view that supplementary vitamins were the *sine qua non* of diet there has been a reaction that threatens to result in an underestimation of their value. Fortunately, commercial enthusiasm is protean and can feed on sensationalisms compounded from the antibiotics, ACS, and radioactivity, while investigators can continue their studies of the vitamins without being importuned to grace advertisements with testimonials.

As with foods, the body's requirements with relation to vitamins are sufficiency of intake, ability to absorb, and adequacy of utilization. There would be little dissent from the opinion that "vitamin deficiency in the aged is more frequent than is generally supposed" (23). Whether such deficiencies are secondary to inadequate intake, or whether body changes in the aged reduce the ability to extract the major benefit from the vitamins, or whether the normal needs for vitamins are greater in the aging body, owing to changed physiological functions—these are matters now being clarified by work on the individual vitamins.

McCay's work (23) has shown that rats on a high vitamin diet live longer than those on a limited intake. It is suggested that in old age the changed, less responsive system requires a change in diet, but that the impact of training and habit persists so strongly that a diet that was ideal in the younger, more active years is in many instances carried over without modification. Such maladjustments lead to degenerative changes characteristic of senility. There is always the possibility that proper adjustments, made in due time, could maintain the bodily status quo and possibly even effect a reversal (24).

The administration of vitamin A in double and quadruple the predicted adequate amounts in laboratory animals lengthened the reproductive period of the females and lengthened the life of both sexes, that of the female notably so. This experiment revealed also the specific benefit of proper

nutrition to the life processes after the attainment of full maturity (25). Clinical benefits would follow upon a wider acceptance of such a concept, which lessens the ascendancy of the dictum "dynamic youth, static age." If it proves possible to influence processes hitherto considered fixed, the much misquoted "fixed period" of Osler may become the "almost fixed period."

Although vitamin B does not influence the normal factors which in the aggregate constitute old age, ingestion of this vitamin has modified some characteristic features of senescence. When experimental animals were fed the known crystalline factors in the B complex, but the filtrate substances were omitted, changes were produced in the gonads, adrenals, and thyroid, with marked acceleration of aging. These effects were reversed by replacement of the absent fraction in the diet (26). Such conditions, when observed in nature without recognition of the deficiency, could be considered due to senile degeneration.

Large amounts of thiamine chloride were found necessary to produce saturation in the older age group, and it was therefore concluded that not only was the diet of these apparently older persons inadequate, but also that part of the insufficiency was due to a decreased ability to absorb and utilize the amounts made available (27). Such evidence indicates the need for increasing our standard of thiamine requirements.

The same investigators (28, 29) found that porphyrinuria, indicating niacin deficiency, was common in the aged, owing, possibly, to hepatic change, and that this condition abated upon the use of additional niacin. In a group over 60 years of age porphyrinuria was found in 43 per cent. In another study (30), although vitamin B deficiency was not proved on a chemical basis, the clinical response to adequate amounts of vitamin B was so satisfactory that it was concluded that these subjects required higher than average amounts of the vitamin. The occasional reversion of hair color after ingestion of calcium pantothenate and para-aminobenzoic acid fits the same pattern (31).

Tuohy (32) has written frequently on the nutrition of the aged, with a repeated plea for optimum intake of vitamin B.

Extensive studies have shown that older persons tend to have a reduced level of ascorbic acid in blood and tissues, although not to the point of having scurvy. The characteristic syndrome of any vitamin deficiency is seen only rarely, but the recognition of the more subtle indications of insufficiency is important. Saturation studies may indicate latent features long before pathological changes susceptible to clinical diagnosis occur, just as a rising blood urea nitrogen may point the way before the pattern of azotemia is recognizable. Older persons require large doses of vitamin C for saturation (33).

The literature is virtually unanimous in describing improvements in health following upon proper vitamin adjustment in the diet. Ideally, an adequate diet and the correction of conditions that reduce the efficiency of

organs should be the starting point. Where insufficiency is apparent in spite of all that can be done with the material available, vitamin supplements are essential. Long-term observations will be necessary to determine what influence such supplements wll have in lessening the manifestations of age, reducing the rate of senescence, and maintaining the tissues in a state better able to cope with progressive pathological limitations. Meanwhile, an improved economic level, better distribution of foods, and year-round instead of seasonal availability of fresh foods must be taken into account in the evaluation of national nutrition.

Summary and Conclusions

By the time old age is reached, the gastrointestinal tract has undergone changes in all its component parts, but not necessarily to the point of inefficiency. On the contrary, if a state of physiological balance has been achieved, obvious major modifications in nutrition are unnecessary. Only by the stresses of disease or exhaustion are the differences between the older and younger gastrointestinal tract thrown into relief. Granted its limitations in the way of smaller capacity and slower response, we may conclude that this system retains many of its abilities to utilize a proper diet.

The digestive juices may be reduced in quantity and quality in the resting state, but response to stimulation is adequate. Further tests of organ function and blood levels confirm the fact that the ability to deal with proteins persists and that there is some impairment in the utilization of carbohydrates and some absolute loss in the capacity to digest fats. The consensus is that vitamin levels should be aimed at a figure higher than that usually found to be normal and sufficient to maintain saturation, not only as a basis for sound organ function but also as an aid in limiting pathological processes.

A study of the facts now available leads to the conclusion that many problems must be investigated before the definitive diet for old age can be prescribed. From the facts now available it would seem that the diet for the older person should be high in protein, moderate in carbohydrates, and low in fat, with vitamin levels higher than average.

Such a plan, based upon objective findings, shows a good degree of correlation with Cornaro's diet, which he arrived at by tedious subjective observations.

References

1. Cornaro, Luigi: The Art of Living Long. Milwaukee: W. F. Butler, 1913.
2. Andrew, Warren: Senile Changes in the Pancreas. Am. J. Anat., 74:97-114 (Jan.), 1944.
3. Felsen, J.: Intestinal Vascular Sclerosis. J. Lab. & Clin. Med., 27:576-85 (Feb.), 1942.
4. Meyer, J.; Sorter, H.; Oliver, J.; and Necheles, H.: Intestinal Absorption In Old Age. Gastroenterology, 1:876-81 (Sept.), 1943.
5. Van Liere, E. J.: The Effect of Senescence on Gastric Emptying. West Virginia M.J., 38:113-17 (March), 1942.
6. Meyer, J.; Golden, J; Steiner, N.; and Necheles, H.: The Ptyalin Content of Human Saliva in Old Age. Am. J. Physiol., 119:600-2, 1937.

7. Fowler, W.; Stephen, R.; and Stump, R.: Changes in the Hematological Values in Elderly Patients. Am. J. Clin. Path., 11:700-5, 1941.
8. Meyer, J.; Spier, E.; and Neuwelt, F.: Basal Secretions of Digestive Enzymes in Old Age. Arch. Int. Med., 65:171-77, 1940.
9. Kopelowitz, J.: Diseases of the Gastro-Intestinal Tract in the Aged. J. Missouri M. A., 38:55-59 (Feb.), 1943. (Quotes Ivy.)
10. Rafsky, H. and Newman, B.: Liver Function Tests in the Aged. Am. J. Digest. Dis., 10:66-69 (Feb.), 1943.
11. Cannon, W. B.: Homeostasis in Senescence. J. Mt. Sinai Hosp., 5:598-606 (Jan.-Feb.), 1939.
12. Hofstatter, L.; Sonnenberg, A. and Kountz, W. B.: Glucose Tolerance in the Elderly Patient. Biol. Symposia, 11:87-95, 1945.
13. Lespagnol, A.; Breton, A.; and Duhem: Glycémie et Indice Chromique Résiduel chez le Vieillard. Compt. rend. Soc. de biol., 129:969-70, 1938.
14. Deren, M.: Dextrose Tolerance in the Aged. J. Lab. & Clin. Med., 72:1138-41, 1936.
15. Lespagnol, A.; Breton, A.; and Duhem: Étude sur le Cholésterol, la Calcémie, L'Azotémie, et la Tension Artérielle chez le Vieillard. Compt. rend. Soc. de biol., 129:971-72, 1938.
16. Kountz, W.; Sonnenberg, A.; Hofstatter, L.; and Wolff, G.: Blood Cholesterol Levels in Elderly Patients. Biol. Symposia, 11:79-86, 1945.
17. Rafsky, H., and Newman, B.: Cholesterol Studies in the Aged. J. Lab. & Clin. Med., 27:1563-66, 1942.
18. Cowdry, E. V.: Problems of Ageing, Baltimore: Williams & Wilkins, 1942. (McCay, p. 707.)
19. Owen, E. C.: Calcium Requirement of Older Male Subjects. J. Biochem., 33:22-26 (Jan.), 1939.
20. Hoffman, L.: Renal Function in the Aged. California & West. Med., 50:16-20 (Jan.), 1939.
21. Newman, B., and Gitlow, S.: The Leukocytes in the Aged Male and Female. Am. J. M. Sc., 205:622-25, 1943.
22. Newman, B., and Gitlow, S.: The Erythrocytes in the Aged Male and Female. Am. J. Med. Sc., 206:677-87, 1943.
23. Kay, L. L.: Multivitamin Prophylaxis and Therapy in Respiratory Diseases of the Aged. Am. J. Digest. Dis., 10:96-98 (March), 1943. (McCay cited.)
24. Davis, N. S.: The Role of Nutrition in the Treatment of the Involutionary Processes of Ageing. Tr. Am. Therap. Soc., 41:67-71, 1941-2.
25. Sherman, H. C.; Campbell, H. L.; Udiljak, M.; and Yarmolinsky, H.: Vitamin A in Relation to Aging and to Length of Life. Proc. Nat. Acad. Sc., 31:107-9 (April), 1945.
26. Morgan, A. F.: Vitamins and Senescence. Scient. Monthly, 52:416-21, 1941.
27. Rafsky, H. A., and Newman, B.: Vitamin B1 Excretion in the Aged. Gastroenterology, 1:737-42, 1943.
28. Rafsky, H. A., and Newman, B.: Relationship of Niacin to Porphyrinuria in the Aged. Am. J. M. Sc., 205:209-13 (Feb.), 1943.
29. Rafsky, H. A., and Newman, B.: Porphyrinuria in the Aged. Am. J. Digest. Dis., 9:43-45 (Jan.), 1942.
30. Chittick, R., and Stotz, E.: Nicotinic Acid and Ascorbic Acid in Relation to the Care of the Aged. Dis. Nerv. System, 2:71-75 (Feb.), 1941.
31. Brandeleone, H.; Main, E.; and Steele, J.: Effect of Calcium Pantothenate and Para-aminobenzoic Acid on Gray Hair in Man. Am. J. Med. Sc., 208:315-21 (Sept.), 1944.
32. Tuohy, E. L.: Geriatrics in Relation to an Adequate Energy-Producing and Protective Diet. J. A. M. A., 114:223-27 (Jan.), 1940.
33. Rafsky, H. A., and Newman, B.: Vitamin C Studies in the Aged. Am. J. Med. Sc., 201:749-56 (May), 1941.

Preservation of the characteristics of youth, and extension of the prime of life are very significantly aided by the taking of a liberal proportion of the needed calories in the form of protective foods. —Henry C. Sherman.

GERIATRICS

Official Journal of the American Geriatrics Society

OFFICERS OF THE AMERICAN GERIATRICS SOCIETY

WALTER E. VEST, M.D., *President*
EDWARD B. ALLEN, M.D., *First Vice President*
HOLLIS E. CLOW, M.D., *Second Vice President*
MALFORD W. THEWLIS, M.D., *Secretary*
RICHARD J. KRAEMER, M.D., *Treasurer*

Correspondence pertaining to the American Geriatrics Society should be addressed to Dr. Malford W. Thewlis, Secretary, 25 Mechanic Street, Wakefield, Rhode Island.

THE NEW YEAR

THERE is no past; the past once was but is no more. There is no present; that which we call the present has neither time, space, nor dimensions of any kind. It is an imaginary dot between that which was and that which will be. However used, it can only denote the immeasurable transition point between the past and the future.

When we speak of the present time it has already gone from us, even as we speak of it. No sentence or act can be recalled. Other words may be spoken and other actions may be taken to alter or modify those of the past, but each, with its final period, belongs to the dead past over which we have no control.

Neither the past nor the present, then, exists, and there remains but one thing that we can apply ourselves to—the future. If we were fatalists or believed in luck, it would not matter; but a rational belief in cause and effect compels a diligent application to the weaving of life's fabric. The future is the golden age of promise; it is something to conjure with. It is ours to shape and mold as we will, according to our various capacities and dispositions. Limited only by these and the opportunities that our

environments may afford, we are the architects and builders responsible for that structure which historians will denominate the year 1947.

Neither mysticism nor religion alone prompts the thought that there must be something in life apart from material things. The good we do, the influence of love and our unselfish acts of kindness, are not garnered by the Grim Reaper. They go to increase the sum total of human happiness. They contribute to the betterment of the world as long as human relations shall continue to exist, and they help to set the ethical standards of unborn millions. That is the future with its undying possibilities. It continues to unfold itself to all, but perhaps with greater opportunities for those whom Robert Louis Stevenson graciously called "the flower of our civilization."

As we stand at the threshold of another year the opportunities of 1946 are gone. We are anxious to see what lies beyond. The gates open upon a strangely familiar vision, another sweep of the Avenue of Service that physicians have dedicated their lives to tread. Nothing could be more beautiful or afford greater satisfaction than to continue the course we know so well and love so much.

A. E. H.

THE MENOPAUSE

THE menopause in women is mainly a genital episode with secondary reactions on other systems and organs: a genital cessation of primary function, with frequent retention of desire; neuro-endocrine reactions, however, may reduce the power of sexual attraction. When female menopause has been completed—often in a few months—there is rest, and a sense of tranquility and liberation. It would seem that the burden of child-bearing is incompatible with declining physical powers. It is not so in man, in whom procreation is merely an incidental demand on his resources. So involution of the reproductive system occurs later in men than in women, and in men reproductive power may be actively maintained into old age. In men, sexual involution does occur. However, it is scarcely possible to speak of a male climacteric, though the Arab and Greek mystics spoke of this age specifically as 63 years. At that age, however, nothing abrupt occurs in men, as it has occurred a decade earlier in women. Testicular reduction is introduced with less brusqueness than is ovarian insufficiency. In the male the process of genital decline is a slow process of years. Increased thyroid activity is much less evident in men than it is in women. Men are exempt from sudden feelings of heat, of violent flushings, from palpitations other than those caused by nicotine and over-eating and over-drinking. Such symptoms spell abnormal endocrine function in woman; but in man, the same process takes different expression: a tendency to abdominal fat, while the limbs and face grow thinner; to these may be added a fussy irritability and a shortness

of both breath and temper. All these, if acquiesced in with over-much patience, may land a man prematurely in carpet-slippers by the fire. However, dyspepsia and obesity of mind and body are the completed insignia of menopause rather than the signs of its progress and continuance.

This period, like its analogue of puberty, is a period of emotion and adaptation. Just as inherent weaknesses show themselves in adolescence, so may they become manifest at the second period of the menopause.

In both puberty and menopause, in both sexes, the mental and emotional colouring may be strongly sexual by reason of the inherent power of this instinctual drive, enhanced by the prohibitions by which its activities are socially restricted.

In men genital involution is normal in the late fifties and early sixties—Erectile power declines many years before the death of desire—a physiological syncopation which gives rise to experimentation in sexual procedures which may grow perverse, unbridled, and, worse still, beyond the bounds of social wisdom.

Elderly exhibitionists may mature in their sixth or seventh decade; they should be regarded as ill people rather than social malefactors. Such retention—or, sometimes, increase of desire—lacking physical prowess, may give rise to a circumstantial excitement, such as the desire of elderly men for young girls of the age of puberty.

Such longings may come also to women who in the middle of their fifth or sixth lustrum may become enamoured of lads in their teens and early twenties.

A tragedy is thus in the making mentally for some of both sexes. For in women, desire and power for sexual activity may live to an advanced age while sexual attractiveness hugely declines; in many men attractiveness may be retained along with desire while power has vanished. Such patients may achieve both social and emotional grief.

On the whole—youth has more active, less shrewdly analytical—more revolutionary impulses than has age. With advancing years, ideas usually grow less accessible and inhibitions increase. Audacity is of youth—often with no clear perception of what to be audacious about—protection and conservation is for later years.

It has been said that the youth who is not radical has no heart, and the man of middle age who is not conservative has no brains, but education might teach the youth to be conservative until he has learned the nature of the world in which he has to live—at about 33 perhaps—then he should be encouraged, if he so wishes, to go thereafter to the Left as fast as his ideas and legs will take him. Certainly it is absurd for a man of 21 to claim his right to shatter to bits a world of which he is quite ignorant just because he wants to, but he should be given every opportunity to do so when he has reached a certain knowledge and maturity. And some men do this. Goethe comes to mind, but he could fall desparately in love at 74: which reminds us

that retention of the power for action and creation usually means the retention of the genital powers as well.

However, new patterns, new styles of thought, rarely come after sexual decadence. Men, then, and women, too, are apt to be content with their conditioned reflexes—they may soar on the old Pegasus to the familiar mountains, but rarely do they find new steeds. They usually accept the unhoped serenity that men call age, and grow acquiescent.

So, in these thoughts there is a physiological interpretation of some "mental" ills. They offer a chance to remarry Soma and Psyche whose divorce has been deplorably advertised by some schools of psychiatry who have preferred *ecology* to *physiology* as paths by which to seek for knowledge of mankind.

F. K.

GRANTS FOR RESEARCH ON AGING

The National Institute of Health has established a "Research Grants Division" to administer the research grant program of the U. S. Public Health Service. To aid this program a number of "Study Sections", each specializing in a particular field of medical research, has been created.

Gerontologists will be interested to learn that a "Gerontology Study Section" has recently been appointed. It has two functions, the first of which is to review applications for research grants in the field of Gerontology. In accordance with this responsibility, members of the Study Section will be glad to discuss research projects with prospective applicants.

The second function of the Gerontology Study Section is to survey the status of research in this field. The members of the Study Section would greatly appreciate receiving information under the following headings: (1) Present research related to Gerontology. (2) Contemplated research (whether or not grants will be sought from the National Institute of Health). (3) Institutions in a position to conduct research on aging. (4) Individuals wishing to conduct research on aging (whether at their present institutions or elsewhere).

Digests FROM CURRENT LITERATURE

Leanness in the Aged. (La maigreur chez les vieillards.)

SCHACHTER, LACLINIQUE, MARSEILLES. *J. de méd. et chir. prat.*, 41, No. 39:51-52 (April 5), 1946.

Though precise information is lacking, leanness in old people is relatively frequent. Emaciation caused by neoplasms, tuberculosis, advanced renal disease, exogenous and endogenous intoxications, or Basedow's disease is not, of course, considered in this category. Senile anorexia and primitive cachexia of the aged are the conditions referred to. In the course of the latter condition the bones become porous and fragile, the nails are brittle, and the hair is dry and falls out easily, but the basal metabolism value may be normal.

About 12 per cent of the aged suffer from cholesteremia. The development of cholesteremia does not parallel the degree of nitrogen retention or the level of arterial tension. The amount of lecithin in the blood varies inversely to that of cholesterol. Concerning lipoid metabolism in old people it has been ascertained that the fasting curve shows hardly any deviation from the normal, but experimental injections of antipituitary extracts containing rather large quantities of "lipoitrine" (the lipodieretic hormone of W. Raab) produced a decrease of lipemia, in most cases of considerable degree.

Regarding the metabolism of glucides, the blood sugar is normal in the aged while fasting, but after ingestion of large amounts of glucose the blood sugar level remains elevated for some time. It may be reduced by small doses of insulin. The amount of potassium in the blood increases steadily in the aged. The viscera, the internal glands especially, and the brain show signs of atrophy.

The following alterations take place in the endocrine glands in the aged: The parenchyma of the testicles shows atrophy, with interstitial sclerosis. The seminiferous ducts are reduced in size and the cells of the seminal secretion undergo pigmentary degenerescence. Signs of excess of pigment in the interstitial gland are often seen. The ovaries are reduced in volume and are indurated; there are some rare primitive follicles suggestive of the former structure of the organ.

In the anterior lobe of the slightly atrophied hyophysis there is a relative increase of basophil elements. Since basophilism occurs also in certain stages of precocious senility, it is possible that there may be a pathological relation between essential leanness of the aged and basophil invasion of the hypophyseal gland. In the middle lobe of the hypophysis numerous cysts filled with colloid are present, and in the retropituitary lobe there are basophil cells that have emigrated from the anterior lobe, as well as granulations of pigment.

The suprarenal glands are the seat of generalized atrophy. The thyroid gland is generally invaded by abundant sclerotic tissue. In the parathyroid oxyphilous elements predominate over the fundamental elements. Occasionally the epiphysis (pineal body) shows pronounced excess of pigment. Calcareous substance in this pigment is more abundant than in younger persons.

Certain authors suggest that opotherapy or hormone therapy with preparations favoring hydration of the tissues (thyroid, hypophysis, thymus, and the islands of Langerhans of the pancreas) would successfully combat senility and the leanness accompanying old age.

Care of the Chronic Sick and of the Aged.

LORD AMULREE, M.D. and DR. E. L. STURDEE. (Summary of address given to the Parliamentary Medical Group.) *Brit. M. J.*, 1:617-619 (April 20), 1946.

Some medical members of the British Ministry of Health have for some time studied the problems of the aged and long-term sick patient, but so far have only touched the fringe of it because of the newness of the subject and its many ramifications. A number of associations and individuals are now trying out different methods for improving the care of the aged sick.

At present four classes of patients occupy hospital beds unnecessarily: (1) patients with diseases that have become chronic and difficult to treat, because skilled treatment has not been given soon enough; (2) patients who have a disability, but are taken into a hospital only because their friends or relatives are unable to look after them; (3) patients suffering from an illness, such as results from an accident, which could have been prevented, had someone been at hand; (4) patients who have been admitted with so-called chronic diseases which, under treatment, have so improved that the patients could return home, but have nowhere to go.

It has been suggested that from 10 to 20 per cent of the beds of general hospitals should be allotted to the chronic sick, according to the size of the hospital. Periodical consultations on long-stay cases should be arranged.

In some hospitals there are patients who have been allowed to remain in bed for months or years without proper classification or treatment. This situation will have to cease in the new hospital services. If satisfactory accommodation can be made under the housing acts or in other ways for all types of older people—the apparently healthy, the slightly feeble, and the infirm—many people who now spend months and even years in hospitals may be kept about, able to lead interesting and often useful lives until near the time of their deaths.

The type of accommodation required for the aged, cottage homes, the staff for homes and hostels, and heating and lighting problems of homes for the aged are discussed.

False Presenile Delirium. (A propos d'un faux délire présénile.)

MAURICE LETAILLEUR. *Ann. Méd.-Psychol.* 104:176-179 (Feb.), 1946.

The case of an old man treated by the author shows the care psychologists and public health officers must exercise in examining cases of presenile patients, who though subject to attacks of fury when imposed upon, prove not to be mentally unbalanced. The individual under consideration, 66 years of age, had been unhappily married for many years. His wife apparently abused him in every respect, grossly neglected the household, and was extravagant in every way. Her conduct so infuriated him that he attacked her. At her request he was placed under observation in a lunatic asylum, under charges of hostile behavior against his wife and son, pathologically worked up desire for authority, abnormal distrust and avarice, and psychorigidity. In fact, the examining officers insisted that he presented many symptoms of presenile delirium, especially signs of morbid prejudice against certain relatives and maniacal delusion of being persecuted by them. It was also stated that he gave the impression of a patient suffering from paranoia, since, when examined on matters unrelated to his personal preoccupations he showed excellent judgment, though he shrank from certain ideas.

Somatic examination revealed only signs of arteriosclerosis without marked hypertension, and somewhat weak reflexes.

After he had been discharged, following another police investigation, the patient showed no sign of psychomotor disturbance or excitement. He resumed his usual routine, with his daughters taking care of his household.

This case proves clearly that psychiatrists may be misled by a temporary and explainable state of excitation and irritation in an elderly patient.

It is suggested that both physicians and patients would benefit from meticulous records on every case under investigation. Were psychiatric assistance centered more on a medical and less on an administrative basis, especially with regard to the aged, such mistakes would be avoided.

Coronary Occlusion and Myocardial Infarction.

LEONARD E. FIELD, M.D. *J.A.M.A.*, 131:354 (May 25), 1946.

More precise use of the terms "coronary occlusion," "coronary thrombosis," and "myocardial infarction" is needed.

Jacobsen states that intra-atheromatous hemorrhage has rarely impressed him as sufficient to produce complete arterial occlusion. However, the occurrence of simple hemorrhages in arteriosclerotic plaques is well known to pathologists. The significance of such intimal hemorrhages is that they often lead to thrombosis within the lumen of the coronary artery. Occasionally a relatively massive hemorrhage occurs within a soft atheromatous plaque and may completely obstruct the coronary lumen by pressure alone, without the development of a thrombus.

Horn and Finkelstein noted such a mechanism to have been operative thirteen times in 100 hearts showing acute occlusions. They found also that, directly or indirectly, intra-atheromatous hemorrhage was the underlying mechanism in acute coronary occlusion in nearly two-thirds of the cases examined.

Since obstruction of the coronary lumen may result from thrombosis secondary to intimal hemorrhage, or from intimal hematoma without associated thrombosis, the clinician should use the term "acute coronary occlusion" instead of "coronary thrombosis."

Except for rare embolization of a coronary artery, as in subacute bacterial endocarditis, the site of an acute coronary occlusion is always the seat of arteriosclerotic change. Occlusive lesions of the coronary arteries are best demonstrated by multiple transverse sectioning. Under this method a dislodged thrombosis has not been encountered by Horn and Finkelstein in even a single instance.

Field believes the term "acute coronary occlusion" will describe a sudden closure, a rapidly occurring accident during the development of an arteriosclerotic plaque, whether it is based upon thrombosis secondary to intimal hemorrhage, thrombosis alone, or intramural hematoma.

Gerontology and the Eye.

C. W. RUTHERFORD, M.D. *J. Indiana M. A.*, 39:209-11 (May), 1946.

Ocular deterioration in the aged is more often the result of factors outside the eye than within it. However, signs of age in and about the eyes may prove useful in directing attention to processes going on in organs and tissues remote from the eye, and so are important in planning treatment.

Ocular characteristics of senescence arise from two related processes: (1) histological alterations in vascular tissues, leading to impaired nutrition of the dependent structures, the blood vessel walls being altered by hyalin and fatty and connective tissue degeneration. (2) The individual becomes deficient in fat-soluble vitamins. The fat content of the orbit and subcutaneous tissues is reduced by migration or redistribution of fat. The globe recedes and the lids lose accustomed support, and ptosis, ectropion, entropion, and

trichiasis develop. The conjunctiva is tinted yellow, the cornea becomes dull, arcus senilis appears, the iris undergoes atrophy, the anterior chamber is shallow, and the lens takes on a grayish, yellowish, or brownish hue.

The author discusses cataract, glaucoma, retinal and choroidal angiosclerosis, and old age alterations in the vitreous humor, the optic nerve, and the eyelids and muscles. Invasion of blood vessel walls by connective tissue cells constitutes a degree of angiosclerosis which may be construed as strengthening of the structure. The vessel walls lose elasticity and the lumina are narrowed. To compensate for these deficiencies, the heart must beat more forcibly to maintain a supply of blood to all parts of the body; this elevates the fluid pressure throughout the vascular system and constitutes hypertension of a kind.

Hospitals Can Help the Aged.
J. R. McGIBONY, M.D. *Mod. Hosp.*, 66, No. 5:91-94 (May), 1946.

With a static or decreasing birth rate and a life expectancy of 70 years an early probability, a rapidly increasing proportion of older people is inevitable. Within this century the majority of the population of America will be more than 50 years old; one in seven will be over 65, and 40 per cent will be more than 45 years old.

The hospital administrator and his staff should make a major contribution to treatment of the aged. Such opportunities are presented during hospitalization for actual physical illness or for some manifestation of the many mental hygiene problems which only psychosomatic medicine can remedy. In the latter field, especially, the progressive hospital staff can play an important part in easing the obstacles of senescence. Such efforts will help stem the drift of misunderstood, bewildered, sympathy-seeking oldsters into the hands of charlatans and shady institutions.

The personality structure and mental integrity of most old people are fully as good as those of younger groups. Intelligent approach to the problem of caring for the increasing number of old people will aid the hospital and also form the basis for a contribution to gerontology, psychosomatic medicine, the peace and happiness of those in need, and the general stability of the nation.

Formation of "Over 60" clubs, or of some similar auxiliary for both men and women would serve to sustain an interest that is highly desirable for successful hospital administration and would be a strong therapeutic factor in making older persons feel wanted and needed. Such thoughtfulness would provide dividends in good will.

Anesthesia in Geriatric Practice.
ROBERT A. HINGSON, Surgeon, U. S. P. H. S. *Am. Practitioner*, 1:105-7 (Oct.), 1946.

In surgery of the aged the possibility of complications from anesthesia may cause greater fear in both patient and surgeon than surgery itself. In patients with fragile circulatory and respiratory mechanisms relief of fear is as important as alleviation of pain. A technic of administering an intravenous anesthetic under the guise of sedation, in the patient's own hospital room, to the fearful aged patient, is described.

Pre-anesthetic sedation should begin the night before operation to insure a good night's rest. A warning is issued against the administration to the aged patient of even as much as 3 grains of a long-acting barbiturate. Slow elimination of the metabolic products of such a drug may produce psychoses in the aged. The pre-anesthetic analgesics most effective for the aged are codeine, gr. 1 (64 mg.); pantopon, gr. ⅓ (22 mg.); and demerol, gr. ¾ (50 mg.).

Whether anesthesia is produced by volatile gaseous, intravenous, rectal, or nerve-blocking anesthetics, its maintenance should be minimal for the aged

patient and adjusted to his minute-by-minute requirements. Technics of administration, precautionary measures, dosages, and cases are discussed. Measures should be taken against dehydration, acidosis, and anoxia. Toward the end of the operation and in the immediate postoperative moments, as during the entire operation, the gradual reduction of anesthesia requires good teamwork between surgeon and anesthetist. The aged person should leave the operating table with his normal oxygenation and blood pressure. Postoperative safety measures are described.

The Growing Problem of Old-Age Psychoses.

NELSON A. JOHNSON. *Ment. Hyg.*, 30:431-50 (July), 1946.

Little has been written about the care of the rapidly increasing number of psychotic old people. This problem will place a greater burden on the public mental hospital than will returning veterans or any other single factor.

The 34-year (1910-44) trend in the Warren State Hospital in Pennsylvania (a state that for the past thirty years has had 7.5 to 7.9 per cent of the country's population of 65 and over) is discussed. The increase in hospital admissions of patients of 65 and over is shown to exceed the increase of all other admissions, and also to exceed the increase in this age group in the general population. The author predicts that within less than a decade senile psychoses and psychoses with cerebral arteriosclerosis will relegate schizophrenia to second place in the number of new admissions.

The special difficulties of caring for the aged psychotic patient are discussed. The author believes that a year of care of the aged patient is probably equivalent to at least two years for any other than the recently admitted or chronic disturbed patient.

The establishment of a geriatrics unit in every mental hospital is advocated in order to lend new dignity and respect to the jobs of people working with old people, to stimulate interest in new methods of care and treatment, and, above all, to prepare, in allocation of space and personnel, for the reception and care of the great number of aged patients the mental hospitals must expect in future.

Basic Principles in Geriatric Surgery.

LOUIS CARP. *Ann. Surg.*, 123:1101-10 (June), 1946.

Experience in geriatric surgery with bad-risk patients in the Goldwater Memorial Hospital, New York, is described. In 450 major operative procedures, 13 per cent of which were emergency, the operative mortality was 22.6 per cent. These, combined with 2108 major operative procedures in the aged in five other clinics, produced an average mortality of 13.1 per cent for 2558 cases. This rate is not prohibitive when compared with operative mortality statistics in all age groups from five clinics after various major operations. The aged stand operation better than is generally believed. Advances in medicine and surgery and improvement in anesthesia have increased the success of geriatric surgery.

The chief contributing causes of operative death are heart failure and/or bronchopneumonia and pulmonary edema. Coronary sclerosis *per se* with secondary old myocardial damage without decompensation is not a contraindication to operation. Acute coronary occlusion after operation is infrequent.

The author discusses the distinction between biological and chronological old age; the importance of geriatric surgery; the interdependence of surgery and medicine; indications for operation; surgical risk; tolerance to operative therapy; causes of operative

death; psychiatric considerations; anesthesia; and general considerations in geriatric surgery.

3 tables. References.

Pneumonia in the Aged.

FREDERIC D. ZEMAN and KAUFMAN WALLACH. *Arch. Int. Med.*, 77:678-99 (June), 1946.

Modern chemotherapy has made it necessary to revise Osler's dictum that pneumonia "may well be called the friend of the aged," since it can be counted on to take them off in "an acute, short, not often painful illness." Today it is a common clinical experience to see old persons recover from acute pulmonary infections, in spite of complications, when they are treated with the sulfonamide compounds and penicillin, in conjunction with inhalation of oxygen and measures to combat associated diseases.

The authors studied 166 cases of pneumonia in men and women 60 years of age and older. Of these, 33, or 20 per cent, were fatal. Of 65 cases due to various types of pneumococci, 8 were fatal. Sulfonamide therapy was used in 128 cases; in 5 of these, additional type-specific serum was given. Penicillin was used successfully in 11 cases, including an empyema due to type III pneumococci in a man aged 84 and a meningitis due to type II pneumococci in a man aged 74.

Pneumonia is still a disease with high incidence and high mortality in the aged, despite recent advances in therapy. With the proper appreciation of the complex problems encountered in the old and better methods of treatment, further improvement in results may be expected. In the aged the disease appears in unusual forms both in onset and course, and it is commonly associated with other conditions that may obscure and aggravate it. Physicians should be on the alert for pneumonia in the aged, and treat it actively. Its occurrence should not be assumed merely because of its prevalence in the aged or because of the presence of a few rales at the bases of the lungs. The period is past when an unqualified diagnosis of pneumonia on the death certificate of an elderly person may be considered adequate, as it was in the past, when no one expected old persons to recover from the disease.

4 tables, 42 references.

Indications for Transurethral Resection.

(Indicaciones de la resección transuretral.) R. VARGAS ZALAZAR. *Sexto congr. chileno cirug.* (1944), 6 (1945), 454-58.

Two of the outstanding features of indications or contraindications for the transurethral procedure are (1) the technical ability of the urologist to perform the resection of the obstacle by this comparatively new method, and (2) medical indications, especially with regard to the condition of the lesion.

Postoperative treatment is continued by the system of hydration of the patient with physiological and hemostatic serum; the catheter is removed on the fourth day and most of the patients are discharged before the tenth day after the operation. Complications are rare, and very few patients require blood transfusions. If necessary, bleeding may be stopped by means of electrocoagulation. In cases of urinary infection due to the operation, patients may require treatment with sulfa drugs, as well as acid medication with mandelates and ammonium chloride.

The transurethral method of operation induces patients who formerly dreaded the idea of an operative intervention through cystotomy to undergo the transurethral treatment before the disease becomes so advanced that it is practically inoperable.

Surgical Problems in the Aged.
J. M. Dorris. *Memphis M. J.*, 20 (May 1945), 67.

Advanced age and senile degenerative change are not contraindications to surgery. During the period of anesthesia there should be no anoxemia. Oxygen should be given freely; cyclopropane is preferable to ethylene. When cardiac arrythmia is present nitrous oxide with ether is advised. Vinethene is excellent for short procedures. Refrigeration anesthesia holds great promise for patients in advanced years where amputation becomes necessary. Vitamin K is useful in hastening blood coagulation. The liver reserve can be estimated by the bromsulphthalein test and the vitamin K prothrombin test. The liver should be fortified with large amounts of easily assimilable sugar prior to operation.

Urological Problems of the Aged.
T. D. Moore. *Memphis M. J.*, 20 (May 1945), 68-71.

Urethritis, pyelonephritis, ureteral calculus, carcinoma of kidney and bladder, benign hypertrophy of the prostate, and carcinoma of the prostate are discussed, the last two in detail.

Some of the safety factors in the management of urological problems in the aged are: avoidance of instrumentation at original examination; due regard for impaired renal function and measures to restore normal function through urinary drainage; and judicious use of chemotherapeutic agents, such as sulfonamides and penicillin. Inhalation anesthesia in the aged should be avoided. Pontocaine in minimal doses (10 to 15 mg.) is very satisfactory for spinal anesthesia. Pentothal sodium is also recommended.

Present Aspect of the Problem of Cancer of the Prostate. (Aspecto atuais do problema do câncer da próstata.)
S. Kaiser. *Rev. brasil. de med.*, 3, No. 2:94-107 (Feb.), 1946.

The present status of the problem of prostatic cancer is reviewed, with an analysis of the outstanding clinical results obtained in treating cancer of the prostate. Most of it is based upon the results obtained by Huggins through castration. The author describes four cases under his personal observation, three of which were treated by orchidectomy and one by administration of stilbestrol. The cases in question showed active response to the hormonal "feminizing" treatment, with complete and rapid disappearance of pain; considerable improvement in the urinary disturbances; involution of the prostatic tumor, including the lymphatic metastasis; and improvement in the general condition. In a castrated patient who died two months later from myocarditis the author was able to prove histologically the remarkable regression of the malignant tissue in the prostate caused by the inversion of the hormonal balance.

The author concludes that the results, impressive and dramatic as they may be, are nevertheless only temporary. The treatment serves a palliative purpose in cases where there is no possibility of radical prostatectomy. Unfortunately, radical prostatectomy is rarely possible, and palliative treatment by orchidectomy or stilbestrol must usually be resorted to. Orchidectomy should be the procedure in severe cases with metastases and pain, whereas administration of stilbestrol is sufficient for inoperable cases, as well as for those without metastases and with infrequently occurring symptoms.

The problem of acid phosphatase is given special attention. In fact, studies of phosphatase formed the starting point for the revision of this type of cancer in hormonal terms. In practice

its diagnostic value is well defined and may be expressed in the following manner: a high degree of phosphatase in the serum indicates the presence of prostatic metastasis in the organism. Other peculiar points in this pathology are its osteoblastic nature and its decided preference for the bones of the pelvis.

Another interesting subject is the method of dissemination, which seems to have been made clear through Batson's research on the intrarachidian plexus.

3 figures, bibliography of 58 references.

Urological Hypertension. (Urologische hypertensie.)

F. VAN GOIDSENHOVEN and J. VANDENBROUCKE. *Belgisch Tijdschrift voor Geneeskunde,* 2, No. 4:169-75 (April), 1946.

The authors discuss high blood pressure in affections of the arteria renalis; hypoplasia of the kidneys in congenital renal affections and the urinary tract; urinary obstructions; atrophic pyelonephritis; urinary lithiasis; kidney tuberculosis; and tumors of the kidney, as well as reversibility of hypertension following conservative interventions in the kidneys (especially for pyelonephritis and voluminous hydronephrosis) and in the renal duct (the ureter); orthostatic hypertonia; and operative treatment of urological hypertension.

The pathogenetic mechanism in high blood pressure is probably of humoral nature. A diagnosis of distinct unilateral urological impairment in the patient suffering from hypertension is decidedly an indication for operation, not only in cases of hydronephrosis and renal tuberculosis, but also in cases where surgical intervention might not have been necessary except for the association of high blood pressure with the unilateral renal affection.

Before operating in such cases it is essential to make sure that no insufficiency of the other kidney exists and that the high blood pressure is not of other than renal origin.

The Surgical Treatment of Prostatic Obstruction.

REED M. NESBITT. *Bull. Acad. Med. Toronto,* 18: 12 (Sept. 1945), 215-29. (Same article in *Canad. Med. Assn. J.,* Sept. 1945.)

The exact cause of benign prostatic hypertrophy in man is not known, but there is evidence that endocrine factors play an important role. However, the results of administering estrogenic hormones have proved disappointing.

The relief of prostatism is therefore dependent upon surgical treatment. Three types of operation are available; suprapubic, perineal, and transurethral prostatectomy. Each has merits and disadvantages, and none is ideal in every case. The techniques of suprapubic and perineal prostatectomy, evolved over a long period, are familiar, as are the expected operative morbidity and mortality and the end results of the operation. The transurethral operation, developed more recently, is the chief subject of this paper.

The resectoscope of today enables the surgeon to excise tissue rapidly, with a minimum of tissue destruction; to orient himself perfectly within the field of operation; and, with the aid of the magnifying lens system employed, to identify more accurately than with the unaided eye all structures within the field of operation. Bleeding is under control at all times. Since the instruments can be operated with one hand, the surgeon is able to use his free hand for rectal palpation; thus he has tactile as well as visual guidance.

The skillful resectionist is able to remove all the diseased prostate by a careful and meticulous technique. He obtains a low morbidity and mortality and end results that compare very

favorably with those obtained by open prostatectomy. To the patient the chief advantages are safety, comfort during hospitalization, short duration of incapacity from operation, and excellent end results. The disadvantages, due chiefly to limitations of the surgeon's skill, are the following most frequently reported complications: hemorrhage, rupture of the bladder or prostatic urethra by cutting too deeply in vulnerable areas or areas that should not be incised at all, and urinary incontinence.

However, bleeding during resection can be adequately controlled so that operative hemorrhage is rarely excessive and suprapubic cystotomy, to arrest hemorrhage, should never be necessary. Likewise the skillful resectionist will not use the cutting current except when he is perfectly oriented and should therefore have no difficulty in recognizing and avoiding injury of the vulnerable structures.

Inadequate resection is the commonest source of poor results. In the early days of this operation many surgeons believed it necessary to remove only sufficient tissue to relieve obstruction. It is now known that partial removal is often followed by sloughing of the rest, with the result that the patient has persisting cloudy and infected urine, recurrent spotting of blood or even gross hematuria, and dysuria. Another source of postoperative difficulty is traumatic stricture of the urethra, most commonly at the urinary meatus. It results from the use of instruments too large in caliber and not easily accommodated by all urethras, and can usually be prevented if the surgeon takes care not to injure the urethra while introducing the resectoscope and performs meatotomy when the meatus does not adequately accommodate the instrument.

A brief account of the operation is given. The encircling maneuvers are usually carried out in three zones: (1) the intravesical zone, consisting of tissue projecting upward into the bladder and comprised of the median lobe, if enlarged, and the lateral lobes if enlarged in such a way as to project into the bladder; (2) the adenomatous mass within the prostatic fossa; (3) the zone occupied by the apex mass of tissue.

The indications for transurethral resection are in general the same as for open prostatectomy. Ordinarily the diagnosis is easily made, but in some cases the history and physical findings are misleading and diagnosis can be established only after comprehensive examinations. Associated with the most important symptom, urinary obstruction, are increased frequency of urination, nocturia, recurrent bleeding, or recurrent urinary tract infection. In so-called silent prostatism the only symptoms may be weakness, ease of fatigue, diurnal somnolence, loss of appetite, and constipation.

The Peripheral Blood Flow under Basal Conditions in Older Male Subjects with Normal and Elevated Blood Pressures.

HAROLD J. STEWART, WILLIS F. EVANS, and HELEN S. HASKELL. *Am. Heart J.*, 31:343-51 (March), 1946.

Peripheral blood flow as well as skin and rectal temperatures have been measured in 25 male patients 38 to 77 years of age. In 12 subjects there were clinical signs of vascular damage without hypertension, and in 13 there was hypertension as well. In only one subject was there evidence of occlusive peripheral vascular disease. The results in these patients have been compared with those in normal young male subjects. The method employed was that of Hardy and Soderström.

The average peripheral blood flow at 27° C. is in the same range in older individuals with normal blood pressure (73 cc. per square meter of body

surface per minute) as in younger male subjects, but is lower (55 cc. per square meter of body surface per minute) in those with hypertension; it approaches the value recorded for normal young subjects at the cooler environmental temperature of 25° C.

Rectal temperature is higher in older people than in the young normal group (36.79° C.), and was slightly higher in the hypertension group (37.32° C.) than in the normal blood pressure group (36.95° C.).

The average weighted skin temperature was higher in both the normal blood pressure group (33.99° C.) and the hypertension group (33.92° C.) than in younger subjects (33.74° C.). The skin temperatures of the individual areas of the body surface are warmer in the older patients with normal blood pressure than in younger subjects, except in one area, namely, the shins, where the temperature is lower in the older group. However, patients with hypertension in the older age group have a warmer skin temperature in the upper part of the body, and a cooler one in the lower portion, than do young normal subjects.

The inference is that the peripheral blood flow to the feet is reduced, since their temperature is lower, and that the blood flow to the upper part of the body is increased, since the temperature is higher. The reduction in peripheral blood flow in the lower part of the body is apparently greater than the increase in the upper portion of the system. The net result is an average peripheral blood flow for the whole body which is less than the value in normal young males at the same room temperature. In short, it is comparable to the constriction observed in normal young subjects in an environment of 25° C.

Patients with hypertension in this older age group show the same trends, but to a lesser extent, as those shown by patients with hypertension in the earlier decades.

Hypertension in Ruptured Kidney.
D. C. Corry. *Brit. Med. J.*, 1:433 (March 23), 1946.

Experimental hypertension was first reported by Goldblatt *et al.*, who showed that by application of an adjustable silver clamp, which constricted both renal arteries, the blood pressure was elevated, with only a little depression of the secretory function of the kidney. Later, hypertension was produced by enclosing a kidney in cellophane. It is now known that this rise in blood pressure is the result of an enzyme—rennin—produced by the kidney when the blood flow through that organ is impeded. The rennin acts on a serum globulin—hypertensinogen—to produce a pressor substance—hypertensin. A series of 198 cases of nephrectomy for hypertension in chronic unilateral renal disease was reported by Braasch in 1942. In 65 of these cases the blood pressure at the end of the year was still normal.

Blood pressure is elevated in some cases of ruptured kidney; it returns to normal after several days. This pressor effect is not dependent on the formation of a perirenal hematoma. The only clinical application is that, if the blood pressure is raised, it rules out associated injuries, such as ruptured spleen.

Several cases under observation are described.

The Mechanism of the Fall in Arterial Pressure Produced by High Spinal Anesthesia in Patients with Essential Hypertension.
W. C. Levin; Griff T. Ross; Raymond Echols; and Raymond Gregory. *Federation Proc.*, 5: No. 1, Pt. 2:62 (Feb.), 1946.

The problem indicated by the title has been investigated by the continuous and simultaneous recording of the arterial and venous pressures, before and during high spinal anesthesia, in twelve studies on ten patients in whom

a clinical diagnosis of essential hypertension had been made.

The data show no uniformity regarding the changes in arterial and venous pressures. The venous pressure may fall without any decline in the arterial pressure. The arterial pressure may fall greatly for a number of minutes before the venous pressure decreases. The venous pressure may rise to control levels while the arterial pressure remains at the lowest level of fall by the spinal anesthesia.

It is concluded, therefore, that high spinal anesthesia in patients with essential hypertension produces no uniform change in the relation between arterial and venous pressures; that the changes in the arterial and venous pressures are not causally related; and that the fall in arterial pressure probably is not due to a diminished cardiac output produced by decreased venous return.

Hepatic Cirrhosis, Atheromatosis, and Experimental Renal Sclerosis, in Relation to Various Dietetic Factors; Continuation. (Cirrosis hepática, ateromatosis y esclerosis renal experimental, en relación a diversos factores dietéticos; continuacion.)

José Froimovich S. *Bol. Soc. méd. Mendoza,* No. 20:573-88 (Nov.), 1945.

Experiments on the influence of substances rich in cholesterol added to the diet of test animals (rabbits) are described.

If 8 cc. of cholesterol in olive oil at 3 per cent are added every other day to the normal diet of test animals, an increase of cholesteremia up to 6066 per cent is found. Aortic atheromatosis is produced thereby within 385 days, following 151 administrations. Congestion and fatty degeneration of the liver, with macroscopic and microscopic manifestations of cirrhosis, result after 198 doses of cholesterol have been given within 477 days. Chemical analysis of the liver reveals increase of cholesterol, fatty acids, and substances soluble in chloroform, and decrease of lecithine.

Upon daily addition of the yolk of an egg, increase of cholesteremia up to 3900 per cent is found, also increase of calcemia and total proteinemia, but decrease of inorganic phosphatemia. Lesions of aortic atheromatosis are observed from the 85th day on after 74 such additions, as well as cardiac hypertrophy. In the liver occurred dilatation of the central vein of the lobule, with increase of parenchymatous fat; cirrhosis developed at the end of 100 days, following 88 additions of this kind. Chemical analysis of the liver showed increase of cholesterol and slight increase of phosphated lipoids.

Daily administration of one egg yolk and 8 cc. of cholesterol at 3 per cent every other day, added to the normal diet, produces an increase of cholesteremia up to 1221 per cent, increase of the total nitrogen, nonprotein nitrogen, and total protein; aortic atheromatosis occurred after 20 doses of cholesterol and 39 doses of egg yolk in 43 days. In the liver fatty infiltration was detected microscopically.

The kidneys showed evolution of sclerosis after 45 doses of cholesterol and 87 administrations of egg yolk within 95 days. Thickening and obstruction of the vascular lumina of the lungs, kidneys, and spleen were observed.

Daily addition of a whole egg produced increase of cholesteremia up to 2856 per cent, also of total nitrogen, nonprotein nitrogen, and total protein. Aortic atheromatosis occurred after 67 doses within 73 days. Slight infiltration of the liver was ascertained microscopically; in certain cases it caused the cells with large vacuoles in the interior to disappear. The kidneys presented parenchymatous and vascular affection.

12 figures.

An Outline of the Present Status of Carcinoma of the Prostate.

W. C. QUINBY. *Bull. New England Med. Center,* 7 (Oct. 1945), 209-12.

Because of the insidious nature of prostatic carcinoma, annual rectal examination of men of 50 or older should be stressed. Total prostatectomy is the only method of eradicating the disease and should be performed whenever possible. The reduction of androgens brought about by castration is an important aid in reducing the activity of the neoplasm and its metastases, and it should be offered to all patients whose gland cannot be removed by prostatectomy. For those patients with few symptoms of obstruction, but who have carcinomatous invasion too extensive to permit total prostatectomy, castration followed by diethylstilbestrol treatment is advised. For those with obstructed bladder, transurethral resection of a sufficient portion of the malignant prostate, combined with castration, is considered advisable; and for patients in whom total prostatectomy can be done, orchidectomy may be deferred until such time as a rise in the phosphatase value in the blood serum suggests a possible recurrence of growth.

Physiopathology in a Case of Retinal Angiosclerosis. (Consideraciones fisiopatológicas sobre un caso de angioesclerosis retiniana.)

MOISES BRODSKY. *Arch. de oftal. de Buenos Aires,* 20, No. 10-12:400-7 (Oct.-Dec.), 1945.

Physiopathological investigations of a case of retinal angiosclerosis in a woman, 64 years old, are discussed. The author upholds that the ophthalmic tonus is increased through diminution of the capillary activity. According to the author, this is proved by the neurocapillary test and through disturbances caused in the evacuatory tracts by phlebosclerosis. Elevated ophthalmic tension attenuates frequent manifestations in angiosclerotic retinopathy.

In the case under observation the increased ophthalmic tonus resulted in alleviation, and the fundus of the eye did not present the alarming picture of hypertensive retinopathy.

Therefore, whenever phlebosclerosis is decidedly marked it may check the influence which ophthalmic tension exercises; however, in such cases the ophthalmologic signs will always be found to be less pronounced than in cases of patients whose ophthalmic tonus is normal or diminished.

5 figures.

Carcinoma of the Prostate Gland, and Benefits of Diethylstilbestrol or Orchiectomy.

CARL A. WATTENBERG. *J. Missouri M. A.,* 42:482-85 (Aug.), 1945.

The diagnosis of carcinoma of the prostate is not easy to make in some instances. Often the tumor is slow-growing and insidious and may be difficult to diagnose by palpation. The prostate may be small and firm on rectal palpation and still be carcinomatous with metastasis to bone, lymph tissue, or other organs. With rectal palpation there is 20 to 25 per cent diagnostic failure. An area of scar tissue or prostate calculi may suggest carcinoma and yet it will be very difficult to diagnose by rectal palpation. A small area of carcinoma in a large adenomatous prostate is also a difficult diagnostic problem.

When positive, acid and alkaline phosphatase data are of help in making a diagnosis; however, a patient can have metastatic cancer of the prostate and still have normal blood values. Roentgen-ray films are helpful in mak-

ing a diagnosis of bone involvement from carcinoma of the prostate gland. The pelvic girdle film is usually first to show metastatic skeletal carcinoma. However, the only definite method of diagnosing prostate carcinoma is microscopic examination of a biopsy specimen.

In treating carcinoma of the prostate diethylstilbestrol or bilateral orchiectomy, or both, should be used in every case. On this question 47 of 70 urologists hold that castration should be performed later, after signs of metastasis have developed. The author recommends administration of diethylstilbestrol as soon as a positive diagnosis of prostatic cancer has been made. The oral dosage varies from ⅓ mg. to 10 mg. a day, depending on the patient's response and on the side effects observed, which may consist of nausea and dizziness. Many patients get enlarged, painful breasts, but these changes, representing a proliferation of the duct epithelium, are not serious. Edema of the lower extremities, penis, and scrotum also occurs as a secondary effect. It is due to decreased renal excretion, which in turn keeps water in the tissues, with reduction in urine volume. This toxic change can be guarded against by vitamins and nutritive diet, and is the result of change in the glycogen storage in the hepatic cell.

Aside from the feeling of marked well-being produced in the patient, one of the most striking benefits from this therapy is the relief of pain.

6 figures.

The Clinical Diagnosis of Coronary Artery Sclerosis.

A. STUART FERGUSON. *New York State J. Med.*, 46, No. 7:737-38 (April 1), 1946.

Symptoms of coronary artery sclerosis frequently occur in the forties, but most often in the so-called dangerous fifties. The symptoms occur about three times as frequently in men as in women. The latter as a group are apt to develop symptoms after middle life.

When coronary insufficiency is ushered in by abrupt, definite chest pain which may radiate to the precordium, or down one or both arms, it may reasonably be concluded that closure of a coronary vessel will probably take place in from two weeks to two or three months.

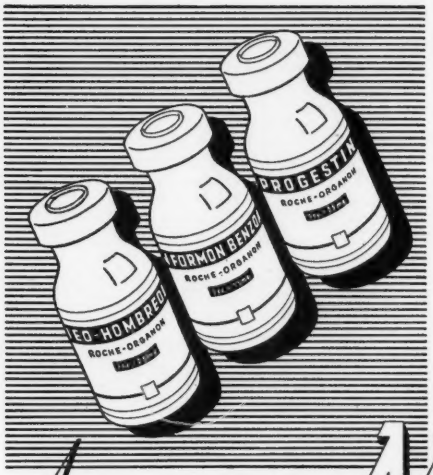
Anginal distress most often is parasternal, or substernal across the upper part of the chest, and, next in order, over the precordial region. Pain described below and to the left of the nipple is least likely to be of cardiac origin.

Clear-cut chest or precordial distress described as oppression, constriction, or ache, associated with exertion or following excitement or anger, should be considered anginal in character until proved otherwise.

A normal or negative electrocardiogram does not mean a normal heart. In a patient who subjectively describes typical anginal symptoms, yet whose electrocardiogram is negative, we are justified in making a tentative diagnosis of heart disease after careful evaluation. Prescribing nitroglycerin in dosage of 1/150 or 1/200 grain is also justified; if distress is relieved within two or three minutes, the result is an important and conclusive diagnostic sign. It is best to start with the smallest dose that will relieve the patient and increase it as the condition warrants.

There is an atypical type of anginal attack in which the location of the pain is either posterior between the scapulae, or in one or both jaws.

The life expectancy of a patient who recovers from a first attack of coronary thrombosis with no evidence of loss of cardiac reserve may be placed between five and ten years. However, there are exceptions in both directions.



NEO-HOMBREOL* *FOR POTENT ANDROGEN THERAPY 25 MG PER CC*

DIMENFORMON* BENZOATE *FOR POTENT ESTROGEN THERAPY 2000 R.U. (1/3 MG) PER CC*

PROGESTIN 'ROCHE-ORGANON' *FOR POTENT LUTEAL THERAPY 5, 10 and 25 MG PER CC*

Announcing NEW

Potent Economy VIALS

EVER IN THE VANGUARD of endocrine research and manufacture, Roche-Organon has just made available to the medical profession new 10-cc vials of its outstanding sex hormone preparations for parenteral therapy. These convenient vials permit savings of up to 30 percent; moreover, they facilitate adjustment of dosage to individual requirements. The therapeutic advantages of Roche-Organon sex hormones have long been acclaimed by physicians; now this new dosage adds worthwhile economy and impressive convenience to superior clinical efficacy.

SAVINGS UP TO 30%

ROCHE-ORGANON, INC.

ROCHE PARK, NUTLEY 10, NEW JERSEY

**Vi-Penta—Reg. U. S. Pat. Off.*

RO-NDP-IF

Hypertensive Arteriosclerosis with Retinal Changes.

E. H. STOKES. *M. J. Australia,* 1, No. 11:378 (March 16), 1946.

A case of a man suffering from hypertensive arteriosclerosis with retinal changes is described. Apart from defective eyesight, he complained of frequency of micturition and dull, generalized headache.

The arteries and arterioles were thin, the veins were "nipped," and various exudates and recent hemorrhages were present. In the electrocardiogram, flattening of the T waves in all leads was suggestive of myocardial aortic degeneration.

On radiological examination of the heart, left ventricular and aortic enlargement was noted. An interesting feature was the presence of numerous fibrolipoma in various parts of the body. Changes were observed in the ocular fundi.

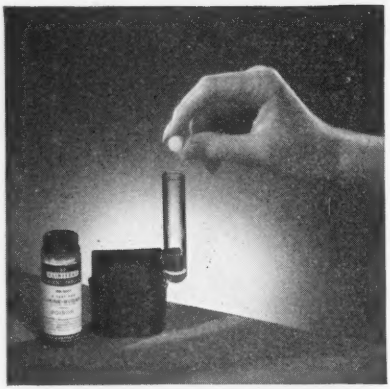
It was considered that, although the ability of the kidneys to concentrate urea and to clear urea from the blood was impaired, the retinal changes were due to hypertensive arteriosclerosis, rather than to renal disease.

Slowly Progressive Occlusive Thrombosis of the Abdominal Portion of the Aorta.

REUBEN STRAUSS, REUBEN MERLISS, and RAFAEL DOMINGUEZ. *Am. J. M. Sc.,* 211, No. 4:421-27 (April), 1946.

Occlusion of the abdominal portion of the aorta may occur when emboli lodge at the bifurcation of the aorta; by acute or rapidly progressive thrombosis; by thrombi developing on emboli; and by chronic or slowly progressive thrombosis. The symptomatology presented by these entities varies according to the rate of development and extent of the lesion. Those associated with rapidly progressive occlusion present a relatively clear-cut diagnostic

(*Continued on page* 70)



URINE-SUGAR TESTING
made
SIMPLE • SPEEDY • CONVENIENT
with

CLINITEST

THE TABLET, NO HEATING METHOD

Simply drop one Clinitest Tablet into test tube containing proper amount of diluted urine. Allow time for reaction—compare with color scale.

NOTE—NEW ATTACHMENT FOR ADDED CONVENIENCE

The test tube clip now supplied with each pocket-size case enables the test tube to be hooked on to the outside of case, as shown in illustration. This simple device provides an added convenience for the user—tube is maintained in an upright position, tube is held motionless during reaction.

FOR OFFICE USE:
Clinitest Laboratory Outfit (No. 2108)

FOR PATIENT USE:
Clinitest Plastic Pocket-Size Set (No. 2106)

Complete Information Upon Request

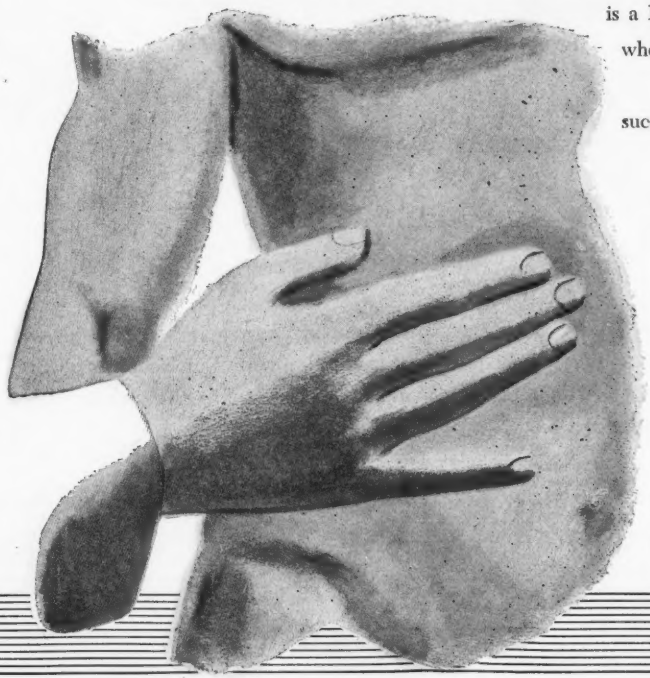
AMES COMPANY, Inc.
ELKHART, INDIANA

SYMBOLS OF SIGNIFICANCE

Digifortis Kapseals

Enlarged liver and dependent edema too often usher in the cardiac patient who has delayed visiting his physician on the false hope that time alone would cure his ills. Prompt digitalization with KAPSEALS DIGIFORTIS may be rewarded by early compensation and disappearance of congestive signs.

Meticulously prepared and precisely standardized, KAPSEALS DIGIFORTIS, is a Parke-Davis product whose past and present history of clinical success in the treatment of heart disease constantly reaffirms the mark of Parke-Davis as a symbol of therapeutic significance.



KAPSEALS DIGIFORTIS, each the equivalent of 0.1 Gm. (1½ gr.) International Standard Digitalis, are available in bottles of 100 and 500.

PARKE, DAVIS & COMPANY • DETROIT 32, MICHIGAN

MEDICAMENTA VERA · P & CO.

clinical picture, but the clinical findings of the slowly progressive type are insidious and easily overlooked.

Three cases of slowly progressive occlusive thrombosis of the abdominal portion of the aorta are presented, with emphasis on the clinical recognition of the condition.

The disease is usually secondary to a severe ulcerative arteriosclerosis of the arterial wall, but it may follow embolism to the aortal bifurcation or thrombosis of the pelvic arteries after irradiation; the last mentioned condition is rather rare.

The average autopsy incidence is 0.12 per cent. The characteristics of this syndrome which permit differentiation from other forms of aortic occlusion are: insidious onset; protracted course; usually, but not always, absence of gangrene; absence of pulses in both lower extremities; weakness in the legs after exercise, with recovery upon rest; and the appearance of arterial hypertension or of signs of visceral infarction years after the signs of muscular insufficiency in the lower extremities were first experienced.

Bibliography of 25 references.

Theocalcin

Council Accepted

In Congestive Heart Failure

For the reduction of edema, to diminish dyspnoea and to strengthen heart action, prescribe Theocalcin, beginning with 2 or 3 tablets t. i. d., with meals. After relief is obtained the comfort of the patient may be continued with smaller doses. Well tolerated.

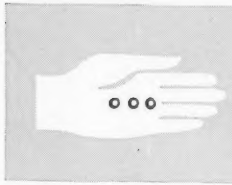
Theocalcin, brand of theobromine-calcium salicylate, Trade Mark reg. U. S. Pat. Off. Available in 7½ grain tablets and in powder form.

Bilhuber-Knoll Corp. Orange, N. J.

BURNHAM SOLUBLE IODINE

Common dosages: Adolescent Goiter—up to 10 drops daily; Prophylaxis — 10 drops weekly; Colds, Arthritis, Arteriosclerosis, Allergies — average 15-20 drops t.i.d. in water before meals. *Sample upon request.*

Burnham Soluble Iodine Co., Auburndale 66, Boston, Mass.



$$(C_5H_{11}O_5COO)_2\,Fe \rightleftharpoons Fe^{++} + 2\,C_5H_{11}O_5COO^-$$

Inherently Agreeable Iron

STABILIZED TO STAY AGREEABLE

FOR HYPOCHROMIC ANEMIAS

Fergon

STEARNS FERROUS GLUCONATE

FERGON, by its chemical nature, is inherently agreeable iron. Only slightly ionized, free of precipitating action on proteins,[1] ferrous gluconate is non-astringent, non-irritating, essentially free from gastro-intestinal distress.

Stabilization, by Stearns' special process, "holds" Fergon in the ferrous state—proved to be better tolerated and "distinctly superior" for humans.[2]

FERGON is particularly valuable in patients who are upset by other forms of iron . . . is so well tolerated that it may—and should—be taken in the fasting state, for optimum absorption.[3]

AVERAGE DOSE for adults is three to six 5 gr. tablets or four to eight teaspoonfuls of elixir daily; for children, one to four 2½ gr. tablets or one to four teaspoonfuls of elixir daily.

Supplied as 0.325 Gm. (5 gr.) tablets, bottles of 100, 500 and 1000; 0.163 Gm. (2½ gr.) tablets, bottles of 100; 5% elixir, bottles of 6 and 16 fl. oz.

Trial Supply Upon Request

Trade-Mark *Fergon* Reg. U. S. Pat. Off.

Frederick Stearns & Company, Division

DETROIT 31, MICHIGAN New York Kansas City San Francisco
Windsor, Ontario Sydney, Australia Auckland, New Zealand

1. Reznikoff and Goebel: J. Clin. Investigation 16:547, 1937.
2. Editorial: J.A.M.A. 127:1056, 1945.
3. Thompson: Biochem. J. 34:959, 1940.

NET WT. 1 LB.
Gerilac
Spray-dried whole milk, skim milk, dried brewer's yeast (source of B vitamins) fortified with riboflavin concentrate, vitamins A and D concentrate from fish liver oil, irradiated ergosterol (vitamin D), ascorbic acid (vitamin C), niacinamide, monosodium phosphate, and iron citrate

BORDEN IS PROUD TO PRESENT

Gerilac

A NEW DIETARY SUPPLEMENT FOR THE AGED

Gerilac basis is milk—nature's most perfect food—modified to provide a high protein and low fat content, with the addition of other dietary factors considered essential in geriatric nutrition . . . so that

Gerilac supplies in one reliquefied pint at least one-third of the protein, a full allowance of each of the vitamins and minerals, and about one-tenth of the calories recommended for daily intake by the Food and Nutrition Board, National Research Council.

Gerilac offers these nutritional values in a palatable, easily consumed and readily digestible form (suitable for use as a beverage or in Special Diets) It also lends itself ideally for the nutrition of convalescents and of pre- and postoperative cases.

Borden's
REG. U.S. PAT. OFF.

PRESCRIPTION PRODUCTS DIVISION
350 MADISON AVENUE, NEW YORK 17, N. Y.

Write for professional literature

Gerilac—A DIETARY SUPPLEMENT FOR THE AGED. *Gerilac contains spray-dried whole milk and skim milk and is fortified with vitamins A and D, B complex, C, together with niacinamide, monosodium phosphate and iron citrate. Available at pharmacies in 1-lb. tins.*

New